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Michigan's Critical Materials Register: Methods For Data Collection and Analysis

by

Linn Duling
Jillann Koebbe
Michigan Department of Natural Resources
Lansing, Michigan 48909

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Project Officers

Karl Bremer
Carolyn Hesse
Region V
U.S. Environmental Protection Agency
Chicago, Illinois 60604

Prepared for
U.S. Environmental Protection Agency
Washington, D.C. 20460

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16. ABSTRACT

This publication contains a discussion of Michigan's Critical Materials Program and its continued development under a Toxic Substances Control Act cooperative agreement provided by the U.S. EPA. Information presented includes the need, authorization and development of a list of toxic substances of environmental concern, which in Michigan is the Critical Materials Register, and the utilization of the Register in Michigan as it applies to industrial discharges of wastewater. Computer programs designed to store, organize and selectively retrieve the information collected from industries on their use and discharge of materials on the Register are discussed in detail. Topics also covered include compliance efforts and field investigations to confirm reported information, uses of the collected information and recommendations for program administration.

This information is intended to aid local, state, and federal governmental agencies in developing a program to evaluate the use and discharge of toxic substances. Although the scope of this report is designed to describe a system of evaluating the use and discharge of toxic substances by industrial wastewater dischargers, the program could be expanded or adapted to evaluate toxic substances discharges to the atmosphere or in solid waste disposal also. It is primarily directed toward governmental agencies that do not presently have a toxic substances evaluation program, however, it should also provide useful insights for those agencies that already have existing programs.

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PREFACE

This report fulfills the requirements of the Toxic Substances Control Act Cooperative Agreement, Section 28 grant awarded to the Michigan Department of Natural Resources. Many people contributed to the information presented in this report and to the publication process. Staff from the following Sections of the Michigan Department of Natural Resources are hereby acknowledged for their invaluable assistance: Office of Toxic Materials Control; Point Source Studies; Environmental Protection Bureau Laboratory; Business Management; and the Data Center. In addition, we would like to acknowledge U.S. EPA, Region V for their cooperation and assistance provided us throughout the project period.

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EXECUTIVE SUMMARY

1. A brief description of Michigan's history of acute and chronic toxic substances incidents is presented. Some of the more severe cases are summarized and impacts on human health and monetary damage to Michigan agriculture, commercial fishing, tourism and the environment are discussed.

2. The statute that is most important relating to the functions of the Water Resources Commission, the creation of the Critical Materials Register and the reporting of the Critical Materials use and discharge is Act 245 of the Public Acts of 1929, as amended. General provisions of Act 245 are given as well as descriptions of the creation of the Critical Materials Register, reporting requirements, and the creation of the surveillance fee for funding environmental programs.

3. A detailed account of the Critical Materials Register is given. A brief history of the register preceeds discussion of the current CMR Program. The purposes of the Critical Materials Advisory Committee are stated and the selection of chemicals for review is explained. Chemical Evaluation consists of literature searches on various properties of these chemicals. To rank according to priority the chemicals are hazard assessed according to a point assignment system. The process, criteria, and rationale for this assignment are given. Limitations of the CMR Program are explained also.

4. Part 9 Rules of Act 245 as amended by Act 293 (Ex. 4-1) are explained. They establish the reporting requirements of every person doing business in Michigan and discharging process or noncontact cooling wastewaters to waters of the state. Following the requirements, is a discussion of the development of the mailing list, the four wastewater/Critical Materials forms, the Critical Materials reporting review and compliance, and the reporting requirements of related legislation. Included in related legislation is the Toxic Substances Control Act, National Pollution Discharge Elimination System, the Resource Conservation and Recovery Act, and Michigan's Hazardous Waste Management Act. Future coordination of efforts between the various reporting systems is explained.

5. The TSCA Cooperative Agreement allowed the MDNR to develop a computer program with a variety of formats designed to meet MDNR program needs. The capabilities, quality control and limitations of the following data programs are given: the Master Program, the Statistical Program, the Hazard Assessment Program, and the Priority Program.

6. Utilization of the data base and related computer programs is presented. Critical Materials information usage is divided into in-house uses of information, other state agencies, local government agencies, use by federal agencies, and other uses. Limitations of data use are also presented.

7. Field investigations were conducted to verify Critical Materials information submitted, to evaluate potential for adverse effects associated with Critical Materials discharge, and to determine the extent of damage when degradation has been confirmed. The summary of field investigations is divided into single facilities discharging to a receiving water, multiple facilities discharging to a receiving water, and multiple facilities discharging to a receiving water via a municipal sewer system. Also presented is a study designed to evaluate levels of chemicals in various Michigan municipal sewage sludges and to follow up on reported or suspected organic compounds detected in a study conducted by Michigan State University.

8. A list of general recommendations to assist state agencies and other organizations in establishing a chemical inventory and reporting system like Michigan's Critical Materials Reporting Program are presented.

PROJECT OBJECTIVES

The purpose of the Michigan Department of Natural Resources-U.S. EPA Toxic Substances Control Act Cooperative Agreement was to provide funding to develop and implement a program to prevent and eliminate unreasonable exposure of Michigan's citizens and environment to toxic substances. Michigan has had an existing Critical Materials Register (Chapter 3) program since 1971. The Register was created to aid the State in its efforts to control and monitor the use and discharge of toxic chemicals. Data on toxic substances use and discharge from the Critical Materials Register (CMR) program provided the primary information upon which this project was based.

The first objective of the project was to develop a more sophisticated computer data system to handle storing, sorting, and analysis of the data (Chapter 5). To accomplish this, it was necessary to simultaneously develop a program to increase compliance with the Critical Materials reporting requirements and improve the accuracy of the reports (Chapter 4.5). Characteristics of industrial facilities and receiving waters needed to be determined and entered into the new data system to complete the data base. This phase of the project was completed during the first year and became operational as each computer program was put on-line.

A second objective of the grant was to develop a computer system to access secondary sources of toxic substances information to supplement the master computer program. Secondary information sources were to include: National Pollution Discharge Elimination System (NPDES) permits, permit applications and Monthly Operating Reports; Pollution Incident

Prevention Plans (PIPP); Water Quality Division facility files; State Groundwater Permits; State Air Permits; U.S. EPA TSCA Inventory and Production Data; and TSCA Pre-manufacture Notifications (PMN's). This system was to be used to verify Critical Materials reporting, to identify potential non-complying facilities, and to enhance overall compliance with the Critical Materials Program. This phase of the project could not be successfully accomplished as proposed. Critical Materials use and discharge information is not computerized in the Groundwater Permits program, Air Permits program, or in Water Quality Division facility files. Problems were also encountered in being able to develop a common facility identification system and common Critical Material identifiers to be used by each system (internal Departmental obstacles and costs for conversion of the various systems) The State was denied access to the confidential TSCA Inventory and Production Data (non-confidential information was of limited value). Progress is being made on computerizing the various programs. Work has begun on using the EPA Identification Number system as the common identifier for facilities on the various computer systems. Chemical Abstract Service (CAS) numbers will be used as the common identifier of toxic substances. Completion of the computerization and conversion is still a few years away, however. The secondary sources of information are used when investigating facilities that could have potential toxic substances problems, however, they must be manually reviewed.

The final objective was the development of a computer program to prioritize potential toxic substances problems (Chapter 5.4) using the information developed above along with the chemical, physical, and toxicological characteristics of the Critical Materials. Included in this phase, was the development of a computer program to store Critical Materials hazard assessment information (Chapter 5.3) and designing a field investigation format (Chapter 7) to investigate the priority rankings of the main program. The program to prioritize potential toxic substances problems met with only limited success. It was evident during development of the program that sufficient environmental background data did not exist and that the extreme variability of receiving water characteristics would require enormous effort (manpower and money) to obtain the necessary background data. In lieu of that, the program format was designed to represent generalized situations based on broad environmental characteristics. The resulting effect was to narrow the scope of the program to that of an administrative tool that could be used in prioritizing MDNR staff functions such as NPDES permit issuance, industrial point source discharge surveys, and biological investigations concerning potential environmental contamination.

In addition to the primary objectives noted above, a portion of the funds allocated were used for development and implementation of analytical methods for chemicals on the Critical Materials Register which could not be determined by the MDNR Environmental Protection Bureau Laboratory prior to the cooperative agreement. A detailed presentation of the analytical methods development is presented in Appendix D.

This publication is intended to aid local, state, and federal governmental agencies in developing a program to evaluate the use and discharge of toxic substances. Although the scope of this report is designed to describe a system of evaluating the use and discharge of toxic substances by industrial wastewater dischargers, the program could be expanded or adapted to evaluate toxic substances discharges to the atmosphere or in solid waste disposal also. It is primarily directed toward governmental agencies that do not presently have a toxic substances evaluation program, however, it should also provide useful insights for those agencies that already have existing programs.

The report is divided into two parts to increase clarity. Part I discusses the need, authorization, and development of a list of toxic substances of environmental concern, in Michigan's case, the Critical Materials Register. It provides background information describing the reasons for a Critical Materials Register, the enabling legislation creating the Register, and the methodology and rationale for its development. Part II describes the utilization of the Critical Materials Register in Michigan as it applies to industrial discharges of wastewater.

It is not intended that this report, in and of itself, be the final answer to solving or preventing toxic substances problems. Obviously, one publication could not be expected to fulfill such a requirement. Rather, it is intended to provide the necessary tools to acquire a reasonable data base concerning potential hazards associated with the use and discharge of toxic substances so that rational, scientific decisions can be made in regulating toxic substances.

PART I

Need, Authorization, and Development of the Critical Materials Register

Chapter 1

Introduction

This introductory chapter is a brief description of Michigan's history of acute and chronic toxic substances incidents. Some more severe cases are summarized and impacts on human health and monetary damage to Michigan agriculture, commercial fishing, tourism and the environment are discussed.

Chapter 1

Introduction

Michigan has had many toxic substances incidents which have resulted in severe environmental problems and the exposure of the citizens of Michigan to these substances. These toxic substances incidents may have adverse impacts on human health for a long period of time. These incidents have also caused millions of dollars of damage to Michigan agriculture, commercial fishing, tourism, and the environment.

The first toxic substance to gain prominence in Michigan was mercury. Southern Lake Huron, the St. Clair River, Lake St. Clair, the Detroit River and Western Lake Erie were found to be severely contaminated with mercury in 1970. Bans on commercial and sport fishing were implemented. Several industrial point sources of mercury were identified in Canada and Michigan. Mercury concentrations in fish have declined since these point sources of mercury have been eliminated. However, consumption warnings still remain in effect for several fish species from these waters.

Monitoring work on the Great Lakes in the early 1970's found elevated concentrations of DDT, PCB, dieldrin, and mercury in several fish species. Fish consumption warnings were issued and remain in effect for certain fish species in all of the Great Lakes. Concentrations of DDT in these fish have declined considerably since the use of this compound was banned. Following sales restrictions and subsequent state and federal bans and enforcement action, levels of PCB in Great Lakes fish have leveled off and are starting to decrease. These toxic substances in Great Lakes fish and the subsequent consumption warning have resulted in the loss of millions of dollars to the commercial and sports fisheries on the

Great Lakes. Fish consumption prior to the warnings and continued consumption after the warnings have resulted in the exposure of many of Michigan's residents to toxic substances. The possible long term adverse impact of this exposure is not known.

Michigan experienced probably the most infamous and costly toxic substances accident to ever occur in the United States in 1973. Polybrominated biphenyl (PBB), a flame retardant chemical manufactured by Michigan Chemical Company, was accidently mixed with cattle feed by Farm Bureau Services. The accident apparently occurred because of inadequate labeling on chemical bags and untrained employees which allowed FireMaster^R BP6, the PBB compound, to become confused with NutriMaster^R, a magnesium oxide cattle feed additive. Subsequent distribution of the mislabeled chemical as cattle feed and cross-contamination in feed preparation led to the contamination of hundreds of Michigan farms. Tens of thousands of large animals (cattle, swine, sheep), over one million chickens, and tons of eggs, milk, butter, feed and other products had to be destroyed due to this PBB contamination. The Pine, Tittabawassee and Saginaw River systems were contaminated with PBB. Fish consumption warnings were issued for sections of these river systems. The financial loss to the State, farmers, and companies involved was astronomical. Millions of dollars have already been paid out by Michigan Chemical Company and Farm Bureau Services to the owners of the affected farms. Many claims remain to be resolved. The State spent millions of dollars investigating the disaster and disposing of contaminated animals. Most of the citizens of Michigan were exposed to PBB in meat and milk from 1973 to 1975. Some farm families who ate their own meat and milk were exposed to extremely high PBB concentrations. The cost in terms of human suffering and emotional upset is incalculable. The total impact of PBB on human health and the environment will not be known for many years.

There have also been a number of cases of serious environmental contamination in Michigan which have resulted from manufacture, use, handling, transportation, and disposal of toxic substances. Some of the more severe cases are summarized below.

(1) Oakland Ankersen, an incineration company in the City of Pontiac, went bankrupt in 1976. A three story building on the site contained over 22,000 55-gallon drums of cyanides, solvents, and other highly explosive, flammable, and toxic wastes. Over 90,000 gallons of Thimet and Cytrolane wastes were left in bulk tanks. The State spent in excess of $700,000 to clean up and properly dispose of this material.

(2) Story Chemical Company in Muskegon went bankrupt in 1977. The Company left behind several bulk containers of the highly toxic gas phosgene as well as approximately 10,000 55-gallon drums and several sludge lagoons of chemical wastes. The State spent over $500,000 on clean up and disposal of these chemical wastes. The U.S. EPA, Region V Central Regional Laboratory in Chicago has identified over 30 chemicals in the groundwater in the vicinity of this plant, including: vinyl chloride, benzene, phenol, tetrachloroethane, naphthalene, toluene, ethylene dichloride, and dichloroethylene. Cleanup of this contaminated groundwater may cost millions of dollars.

(3) A train wreck near Baldwin, Michigan resulted in the spilling of large quantities of phenol, ethylene oxide, and vinylidene chloride. Despite a massive clean up effort in the wreck vicinity, the groundwater in the area became contaminated.

(4) White Lake and the groundwater in the vicinity of the lake near Montague were contaminated by chemical wastes from Hooker Chemical Company. Perchloroethylene, trichloroethylene, carbon tetrachloride, mirex, C-56, and approximately 15 other chemicals have been identified in the groundwater and/or lake. The source of this contamination was a land disposal site on company property used for years as a dump for chemical wastes. Hooker Chemical Company agreed to an out-of-court settlement with the State of Michigan in excess of ten million dollars for clean up and future surveillance of groundwater and surface water contamination.

(5) Several severe cases of PCB contamination have been discovered. The Kalamazoo and Shiawassee Rivers were contaminated by loss of PCB from paper mills and a die casting operation, respectively. Warnings against consumption of fish from these rivers were issued.

(6) Severe groundwater and stream pollution problems resulted from improper land disposal of chemical production wastes by Lakeway Chemical Company in Muskegon County. This company disposed of large quantities of chemical production wastes in lagoons on the company site. Seepage from these lagoons, which were constructed in sandy soil, contaminated a large area of groundwater in the vicinity as well as Big Black Creek. Biological surveys found this stream to be almost devoid of normal stream biota immediately downstream from the company. Chemicals manufactured by this company included 3,3'dichlorobenzidene; the pesticides Oryzalin, Prowl, Cytrolane, Thimet, and Avenge; and approximately ten other organic chemical products.

The chronic effects of low level environmental chemical exposure on human health are extremely difficult to identify and prove conclusively. There is substantial data available to directly demonstrate that the citizens of Michigan have been exposed to large quantities of PCB and PBB, causing elevated concentrations of these contaminants in their bodies. Data available also indicates that some of these people may be experiencing adverse health impacts due to these contaminants. The Michigan Department of Public Health completed an evaluation of PCB levels in the blood of Michigan citizens in 1976. This report, entitled "Evaluations of Changes of the Level of Polychlorinated Biphenyls (PCB) in Human Tissue" (MDPH, 1975), compared PCB blood levels of fish eaters and non-fish eaters. The study concluded that although the general population has PCB concentrations in their bodies, PCB concentrations were significantly higher in people consuming Great Lakes fish. There was a direct relationship between size and quantity of fish eaten and the PCB levels found in human blood. Although no health problems or medical conditions could be attributed to the PCB, the long term effects of this exposure are unknown.

Michigan's experiences with toxic substances problems has had significant impacts on how the public in Michigan perceives toxic substances. It has had the beneficial effect of raising the level of awareness of Michigan residents as to the potential hazards associated with toxic substances and the need for programs to control toxic substance production, use, discharge, and disposal. Conversely, it has created fears in the minds of these same citizens regarding any and all aspects of toxic substances. These fears have made reactions to toxic substances issues emotional and political. This has often made it very difficult to deal with toxic substances problems in Michigan on a rational and scientific basis.

Chapter 2

Enabling Legislation

The statute that is most important relating to the functions of the Water Resources Commission, the creation of the Critical Materials Register and the reporting of Critical Materials use and discharge is Act 245 of the Public Acts of 1929, as amended. General provisions of Act 245 are given here as well as descriptions of the creation of the Critical Materials Register, reporting requirements, and the creation of the surveillance fee for funding environmental programs.

Chapter 2

Enabling Legislation

By creating the Water Resources Commission and outlining its main statutory responsibilities, Act No. 245 of the Public Acts of 1929, as amended (Water Resources Commission Act), is the basic and most important Michigan statute relating to the functions of the Commission, the creation of the Critical Materials Register and the reporting of Critical Materials use and discharge.

2.1. General Provisions of Act 245

Under the provisions of Act 245, as amended, the Water Resources Commission is directed to: a) control the pollution of any surface or underground waters of the state and the Great Lakes; b) control alterations of natural or present watercourses of all rivers and streams; c) establish pollution standards for lakes, rivers, streams and other waters of the state as it deems necessary; d) examine and certify operators of industrial waste treatment facilities discharging wastes into the waters of the state; e) issue permits for all dischargers to the waters of the state which include provisions to restrict the polluting content of proposed new or increased uses of state waters for waste disposal purposes; f) require the annual reporting of Critical Materials use and discharge where certain wastes are discharged (see Chapter 2.2.); and g) assess an annual surveillance fee to any person, company or corporation, except a municipality, discharging water-borne wastes directly or indirectly into the waters of the state (see Chapter 2.3.).

In addition to the aforementioned statutory requirements, the Commission is further authorized to: a) issue permits which include a performance timetable requiring the abatement of existing pollution problems, and restrictions on new discharges to prevent unlawful pollution; b) seek court enforcement of its permits and orders through civil and criminal remedies and penalties; c) determine the volume of water flowing in all streams and the high and low water marks of lakes affected by waste disposal; d) make regulations and orders to prevent harmful interference with the discharge or stage characteristics of streams; e) determine the location and extent of flood plains, streambeds and channels; f) make surveys, studies and investigations of water use; g) cooperate and negotiate with other governments and governmental units; and h) take advantage of and coordinate with any act of the Federal Congress.

Act 245 further provides and authorizes reasonable entry for inspection purposes and monitoring; the promulgation of rules; penalty provisions and appeals; and other procedures necessary for the Commission to carry out its functions. Act 245 is presented, in whole, in Appendix B.

2.2. Creation of Critical Materials Register and Reporting Requirements

Act No. 293 of the Public Acts of 1972 amended Act 245 to, in part, establish a register of Critical Materials and provide for the annual reporting of those Critical Materials by industrial facilities with wastewater discharges other than sanitary wastewater. Section 6b of Act 245, as amended by Act 293, is presented below.

> Sec. 6b. Every person, doing business within this state discharging waste water to the waters of the state or to any sewer system, which contains wastes in addition to sanitary sewage shall file annually reports on forms provided by the commission setting forth the nature of the enterprise, a list of materials used in and incidental to its manufacturing processes and including by-products and waste products, which appear on a register of critical materials as compiled by the commission with the advice of an advisory committee of environmental specialists designated by the commission and the estimated annual total number of gallons of waste water including but not limited to process and cooling water to be discharged to the waters of the state or to any sewer system. The information shall be used by the commission only for purposes of water pollution control. The commission shall provide proper and adequate facilities and procedures to safeguard the confidentiality of manufacturing proprietary processes except that confidentiality shall not extend to waste products discharged to the waters of the state. Operations of a business or industry which violate this section may be enjoined on petition of the water resources commission to a court of proper jurisdiction. The commission shall promulgate rules as it deems necessary to effectuate the administration of this section, including where necessary to meet special circumstances, reporting more frequently than annually.

2.3. Creation of Surveillance Fee for Funding Environmental Programs

Section 13 of Act 293 established a system for collecting surveillance fees from industrial wastewater dischargers to be used to support water pollution abatement programs administered by the Department of Natural Resources. Section 13 was amended by Act No. 116 of the Public Acts of 1981. This amendment establishes a gradual phasing out of the surveillance fee system by 1984. Funding for pollution abatement programs will be increasingly funded from other revenues and in 1984 (and thereafter) will be entirely funded from other revenues. Section 13 of Act 245, as presently amended is presented below.

Sec. 13. (1) In order to provide for increased surveillance, investigation, monitoring, and other activities necessary to provide greater protection of the quality of waters of this state, an annual surveillance fee is payable by a person, company, corporation, but not a municipality, that discharges water-borne waste directly or indirectly into the waters of this state from a manufacturing facility; or from any other commercial establishment that generates a discharge inconsistent with the protection of waters of this state. The fee shall be for the cost of surveillance of industrial and commercial discharges and receiving waters. The cost of necessary surveillance of municipal discharges shall not be financed from annual surveillance fees, but may be financed as otherwise provided by law. The total surveillance fees assessed annually on discharges shall not exceed the total amount appropriated to the commission or other appropriate state agency. Surveillance fees shall be restricted to:

(a) Surveillance, inspection, and pollution prevention including necessary data collection, compliance sampling and analysis directly related to the operations of the fee payers in the aggregate.

(b) Evaluation and issuance of permits to surveillance fee payers.

(c) Administrative support, including laboratory, sampling, and monitoring equipment directly related to the dischargers who pay surveillance fees in the aggregate.

(2) Before February 2, of each year the commission shall inform each discharger and the state treasurer of the annual surveillance fee due from each plant location or major manufacturing component and commercial enterprise, as provided by rule. Except as provided in subsection (6), if notice is not made before February 2 in any year, the surveillance fee shall remain the same as the previous year. High quality agricultural wastewater, which is not discharged directly into a lake or stream but is diverted in accordance with an approved agromanagement plan for irrigation at a rate which approximates the rate of plant uptake and results from normal agricultural operations such as cooling, heating, washing, conveying, transporting, or holding fruit or vegetables shall be exempt from the surveillance fee.

(3) Before March 2 of each year a discharger shall pay to the state treasurer the amount of surveillance fee due. The state treasurer shall deposit the fee in the general fund of this state. The treasurer shall report the total amount collected to the governor and the legislature before April 16 of each year.

(4) The annual surveillance fee shall be based on an administrative fee of $50.00 and an additional fee set by the commission. The

additional fee shall be determined on a graduated basis using a formula developed by rules of the commission promulgated pursuant to Act No. 306 of the Public Acts of 1969, as amended, being sections 24.201 to 24.315 of the Michigan Compiled Laws. The formula shall include the volume and nature of discharge, number of discharge locations, variability of flow volume, stream characteristics, required laboratory tests, area surveillance, difficulty of survey setup, history of compliance and provisions for compliance, and other factors that the commission considers appropriate to establish the total amount surveillance fee. The maximum annual fee assessed shall not exceed $18,000.00 per manufacturing location. For the fiscal year beginning October 1, 1980, the legislative appropriations conversion factor, which is used to match the total surveillance billings with the authorized appropriation, shall not exceed 5.80. A discharger shall not be assessed a fee if the total fee calculated by the formula is $50.00 or less. A discharge into a municipal sewerage system shall be assessed only the $50.00 administrative fee. However, if the discharge, after municipal treatment, is or will become injurious to the waters of this state under section 6, the assessment will be based upon the same consideration as if the discharge, after treatment, were being discharged by the manufacturing facility or commercial establishment directly into the waters of this state. The commission shall promulgate rules necessary to implement this section.

(5) The total surveillance fees assessed annually shall not exceed the total amount appropriated to the Department of Natural Resources or other appropriate state or local agency for surveillance. The total amount of revenue generated annually by water pollution surveillance fees shall not comprise more than 41% of the total funding support from all sources for the fiscal year beginning October 1, 1980, 30% for the fiscal year beginning October 1, 1981, 20% for the fiscal year beginning October 1, 1982, 10% for the fiscal year beginning October 1, 1983, and 0% for the fiscal year beginning October 1, 1984 and thereafter, as appropriated by the legislature, of the state water pollution control and abatement programs authorized by this act. All surveillance fees shall be reduced each year by a percentage equal to the percentage by which total surveillance fees are reduced from the previous fiscal year pursuant to this subsection.

Chapter 3

Critical Materials Register

This chapter is a more detailed account of the Critical Materials Register. A brief history of the register preceeds discussion of the current CMR Program. The purposes of the Critical Materials Advisory Committee are stated and the selection of chemicals for review is explained. Chemical Evaluation consists of literature searches on various properties of these chemicals. To rank according to priority the chemicals are hazard assessed according to a point assignment system. The process, criteria, and rationale for this assignment are given. Closing are the limitations of the CMR Program.

CHAPTER 3

Critical Materials Register

Pursuant to Act 293, P.A. 1972, an amendment to Act 245, P.A. 1929, the Michigan Water Resources Commission is authorized to develop a Register of Critical Materials which are or may be used and/or discharged in Michigan. The development of the Register is based on extensive review of the scientific literature on physical, chemical, and toxicological properties of industrial, pharmaceutical and agricultural chemicals. Advice on establishment and subsequent revisions of the Register comes from an advisory committee composed of environmental specialists from academia, industry, government, and special interest groups. Chemicals selected for review include chemicals with well recognized high toxicity (e.g. PCB's, mercury, cyanide, etc.), those from various lists of priority chemicals developed by NIOSH, EPA, etc., and chemicals of specific concern in Michigan. The review process utilizes a hazard assessment methodology which considers acute toxicity, carcinogenicity, mutagenicity, teratogenicity, persistence, bioaccumulation, and other adverse effects (including subacute and chronic toxicity, feto- or embryotoxicity, phytotoxicity and aesthetics). Chemicals are numerically scored as to their hazard. Those posing a high environmental concern (i.e. high score) are included in the Register. The Register is revised and updated annually as additional information about these chemicals becomes available. Historically, the Act delegated authority to the Water Resources Commission to implement this program. This authority has since been transferred to the Director of the Department of Natural Resources (DNR) by executive order.

All businesses which discharge wastewater other than sanitary wastewater, to the waters of the State (including groundwaters and sewer systems) must file an annual report on Critical Materials use and discharge (see Chapter 4). This information is then used for protection of the environment and human health through water pollution control programs.

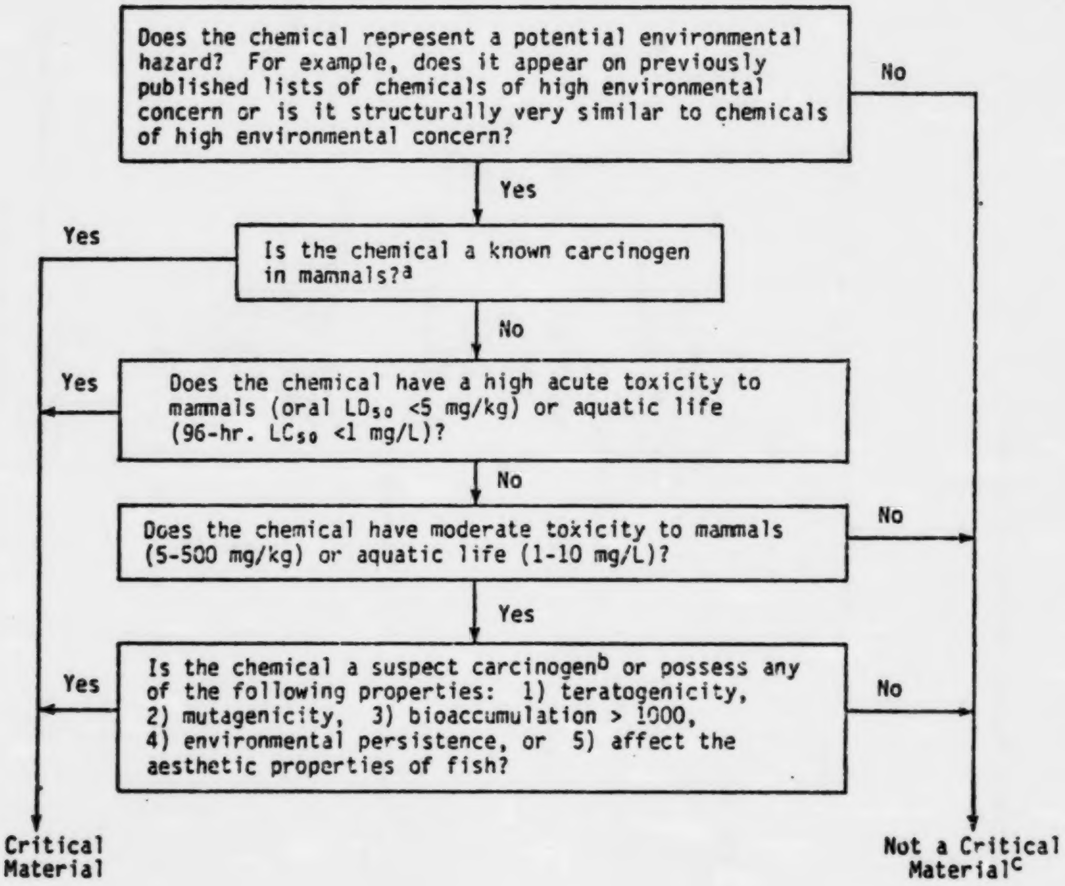
3.1. CMR - 1971 to 1978

The original Critical Materials Register (CMR) compiled in 1971 contained 73 compounds and classes of compounds. These compounds were selected because of their toxicity to organisms or aesthetic problems at concentrations of 5 ppm or less. The CMR was revised in 1972 and was reduced to 62 compounds and classes. No changes were made in the Register between 1973 and 1976.

An extensive revision of the Register along with the methods for evaluating and selecting Critical Materials was made in 1977. A decision was made to move toward development of an objective system for selection and a model was developed to evaluate chemicals for possible inclusion (Exhibit 3-1). The 1977 CMR contained 218 compounds and classes.

The 1978 evaluation procedure became more objective as the review process was changed from a screening model to a numerically scored hazard assessment system. This system is summarized on the 1978 CMR Hazard Assessment Sheet (Table 3.1). Eight factors of environmental concern were identified and a point value was assigned to each category within

Exhibit 3-1 Model for Screening and Selecting Critical Materials, 1977


Does the chemical represent a potential environmental hazard? For example, does it appear on previously published lists of chemicals of high environmental concern or is it structurally very similar to chemicals of high environmental concern?
No
Yes
Yes
Is the chemical a known carcinogen in mammals?[a]
No
Yes
Does the chemical have a high acute toxicity to mammals (oral LD_{50} <5 mg/kg) or aquatic life (96-hr. LC_{50} <1 mg/L)?
No
Does the chemical have moderate toxicity to mammals (5-500 mg/kg) or aquatic life (1-10 mg/L)?
No
Yes
Yes
Is the chemical a suspect carcinogen[b] or possess any of the following properties: 1) teratogenicity, 2) mutagenicity, 3) bioaccumulation > 1000, 4) environmental persistence, or 5) affect the aesthetic properties of fish?
No
Critical Material
Not a Critical Material[c]

a. A known carcinogen is defined as a chemical meeting one of the following criteria: 1) Appears on the NIOSH carcingoen list 2) has been demonstrated through epidemiological studies to be a human carcinogen 3) has been shown at low doses (1% of LD_{50}) to increase tumor production by oral administration in at least two species of animals.

b. A suspect carcinogen is defined as a chemical meeting the following criteria: has been shown to increase tumor production only at high doses (>1% of LD_{50}) or by a route other than oral or in only one species.

c. A chemical not meeting these criteria may still be designated a critical material if the CMR advisory committee determines the compound represents an unreasonable environmental risk due to other factors.

Table 3.1 1978 Critical Materials Register Hazard Assessment Sheet

Common Chemical Name ____________________
Chemical Abstract Name ____________________

Chemical Abstract No. |_|_|_|_|_|_| - |_|_| - |_|

Score

I. Acute Toxicity ______

Score	ORAL LD_{50} mg/kg	DERMAL LD_{50} mg/kg	AQUATIC 96 HOUR LD_{50} mg/L
	Category		
7	<5	<5	<1
3	5-50	5-200	1-10
2	>50-500	>200-500	>10-100
1	>500-5000	>500-5000	>100-1000
0	>5000	>5000	>1000
*	Insufficient Information		

II. Carcinogenicity ______

Score	Category
7	Human positive human suspect Animal positive
3	Animal suspect
2	Carcinogenic by a route other than oral or dermal Strongly potential carcinogen by accepted mutagenicity screening tests or accepted cell transformation studies
1	Potential carcinogen by accepted mutagencity screening tests or accepted cell transformation studies
0	Not carcinogenic
*	Insufficient Information

III. Hereditary Mutagenicity ______

Score	Category
7	Confirmed
4	Suspect - multicellular organisms
2	Suspect - micro-organisms
0	Not a hereditary mutagen
*	Insufficient Information

IV. Teratogenicity ______

Score	Category
7	Confirmed
3	Suspect
0	Not teratogenic
*	Insufficient Information

V. Persistence ______

Score	Category
4	Very persistent
3	Persistent
2	Slowly degradable
1	Moderately degradable
0	Readily degradable
*	Insufficient Information

VI. Bioaccumulation ______

Score	Bioaccumulation	Log P
7	>4000	>6.00
3	1000-3999	5.00-5.99
2	700-999	4.50-4.99
1	300-699	4.00-4.49
0	<300	<4.00
*	Insufficient Information	

VII. Aesthetics ______

Score	Category	
	Fish Tainting/Taste and Odor (Threshold level in water - mg/l)	Foaming, floating film, and/or major color change
3	0.0001-0.001	
2	>0.001-0.01	
1	>0.01-0.1	Yes
0	>0.1	No

VIII. Chronic Adverse Effects ______

Score	Category
4	Irreversible effects
2	Reversible effects
1	Adverse effects by route other than oral, dermal, or aquatic
0	No detectable adverse effects
*	Insufficient Information

the individual factors. A chemical was included on the 1978 CMR if it received a score of seven points in one factor or a cumulative score of seven points or more in several factors. The 1978 CMR contained 190 compounds and classes.

3.2. Current CMR Program

The hazard assessment process was continued in 1979, 1980 and 1981 with additional categories reviewed. The current system is summarized in Table 3.2 and explained in greater detail in sections 3.7.1. to 3.7.7. The 1979 and 1980 CMRs contained 178 and 250 compounds and classes, respectively. The current CMR (1981) contains 252 compounds and classes (Table 3.3).

The CMR is revised and updated on an annual basis in order to be effective. The rapidly changing understanding of toxic substances and numerous new chemicals manufactured each year make an annual review imperative. The review process is initiated about January 1 with DNR staff's development of proposed changes in the hazard assessment process and compilation of a list of chemicals to be reviewed. This information is sent to members of the Critical Materials Advisory Committee for review. Committee meetings are held to discuss these proposals and to finalize the revisions. Concurrently, chemical evaluations of materials selected for review are conducted by DNR staff to gather data for hazard assessment. Assessments are then conducted by staff utilizing the finalized hazard assessment process. The Committee reviews the final

Table 3.2 Current Critical Materials Register Hazard Assessment Sheet

TOTAL SCORE ______

COMMON CHEMICAL NAME ____________________

CHEMICAL ABSTRACT NAME ____________________

CHEMICAL ABSTRACT NUMBER |_|_|_|_|_|_|-|_|_|-|_|

SCORE

I. ACUTE TOXICITY ______

SCORE	ORAL LD50 MG/KG	DERMAL LD50 MG/KG	AQUATIC 96-HOUR LC50 MG/L
7	< 5	< 5	< 1
3	5-50	5-200	1-10
2	> 50-500	> 200-500	> 10-100
1	> 500-5000	> 500-5000	> 100-1000
0	> 5000	> 5000	> 1000
*	INSUFFICIENT INFORMATION		

II. CARCINOGENICITY ______

SCORE	CATEGORY
7	KNOWN POSITIVE POTENTIAL HUMAN ANIMAL POSITIVE
3	POTENTIAL ANIMAL
2	CARCINOGENIC BY A ROUTE OTHER THAN ORAL OR DERMAL STRONGLY SUSPECT CARCINOGEN BY ACCEPTED MUTAGENICITY SCREENING TESTS
1	SUSPECT CARCINOGEN BY ACCEPTED MUTAGENICITY SCREENING TESTS
0	NOT CARCINOGENIC
*	INSUFFICIENT INFORMATION

III. HEREDITARY MUTAGENICITY ______

SCORE	CATEGORY
7	CONFIRMED
4	POTENTIAL (MULTICELLULAR ORGANISMS)
2	POTENTIAL (MICRO-ORGANISMS)
0	NOT A HEREDITARY MUTAGEN
*	INSUFFICIENT INFORMATION

IV. TERATOGENICITY ______

SCORE	CATEGORY
7	CONFIRMED
3	POTENTIAL
0	NOT TERATOGENIC
*	INSUFFICIENT INFORMATION

V. PERSISTENCE ______

		T½ (IN WEEKS)			
SCORE	CATEGORY	WATER	SEDIMENT	SOIL	AIR
4	VERY PERSISTENT	> 52	> 52	> 52	> 52
3	PERSISTENT	40 - 52	40 - 52	40 - 52	40 - 52
2	SLOWLY DEGRADABLE	27 - 39	27 - 39	27 - 39	27 - 39
1	MODERATELY DEGRADABLE	14 - 26	14 - 26	14 - 26	14 - 26
0	READILY DEGRADABLE	0 - 13	0 - 13	0 - 13	0 - 13
*	INSUFFICIENT INFORMATION	*	*	*	*

VI. BIOACCUMULATION ______

SCORE	BIOACCUMULATION	LOG P
7	> 4000	≥ 6.00
3	1000 - 3999	5.00 - 5.99
2	700 - 999	4.50 - 4.99
1	300 - 699	4.00 - 4.49
0	< 300	< 4.00
*	INSUFFICIENT INFORMATION	

VII. OTHER ADVERSE EFFECTS ______

A. TERRESTRIAL AND AQUATIC

SCORE	CATEGORY	
	TERRESTRIAL	AQUATIC (MG/L)
7	IRREVERSIBLE EFFECTS, VERY LOW DOSE	< 0.1
3	IRREVERSIBLE EFFECTS	0.1 - 1
2	REVERSIBLE EFFECTS	> 1 - 10
1	—	> 10 - 100
0	NO DETECTABLE ADVERSE EFFECTS	> 100
*	INSUFFICIENT INFORMATION	

B. PLANT

SCORE	GAS/VAPOR (PPM)	WATER (MG/L)
3	< 1	< 0.5
2	1 - 10	0.5 - 5
1	> 10 - 100	> 5 - 50
0	> 100	> 50
*	INSUFFICIENT INFORMATION	

C. AESTHETICS

SCORE	ESTIMATED THRESHOLD LEVEL IN WATER (MG/L) TAINTING OF FISH AND/OR TASTE & ODOR	FOAMING PROPERTIES AND/OR PRODUCES FLOATING, FILM AND/OR IMPARTS A COLOR CHANGE TO WATER	PRODUCES AN OBJECTIONABLE ODOR IN AIR (PPM)
1	≤ 0.001	YES	≤ 0.0001
0	> 0.001	NO	> 0.0001
*	INSUFFICIENT INFORMATION		

Table 3.3 1981 Critical Materials Register

Michigan Water Resources Commission
CRITICAL MATERIALS REGISTER
Published October 1, 1981

With the exception of Critical Material classes (where all compounds of the material are to be reported) the parameter number assigned each Critical Material is from the Chemical Abstract Service "Registry Handbook." Additional information concerning the Critical Materials Program and the individual materials may be obtained by writing:

Critical Materials Program
Office of Toxic Materials Control
Environmental Services Division
Michigan DNR
P.O. Box 30028
Lansing, Michigan 48909

I. Inorganic Materials

A. The following inorganic materials and *all their compounds* are to be reported.

	Parameter Number
antimony	Class-01-0
arsenic	Class-01-1
beryllium	Class-01-2
cadmium	Class-01-3
chromium	Class-01-5
cobalt	Class-01-6
copper	Class-01-7
cyanides	Class-01-8
hypochlorite	Class-01-4
lead	Class-01-9
lithium	Class-02-0
mercury	Class-02-1
nickel	Class-02-2
selenium	Class-02-3
silver	Class-02-4
zinc	Class-02-7

B. The following specific inorganic materials are to be reported (do not report compounds).

	Parameter Number
chloramines	Class-08-6
chlorine	07782-50-5
hydrazine	00302-01-2
hydrogen sulfide	07783-06-4

II. Organic Materials

	Parameter Number
acetone cyanohydrin	00075-86-5
2-acetylaminofluorene	00053-96-3
acrolein	00107-02-8
acrylic acid	00079-10-7
acrylonitrile	00107-13-1
allyl chloride	00107-05-1
2-aminoanthraquinone	00117-79-3
aminoazobenzene	00060-09-3
o-aminoazotoluene	00097-56-3
4-aminobiphenyl	00092-67-1
3-amino-9-ethylcarbazole	00132-32-1
1-amino-2-methylanthraquinone	00082-28-0
aminotriazole (amitrole)	00061-82-5
aniline	00062-53-3
aniline hydrochloride	00142-04-1
o-anisidine	00090-04-0
o-anisidine hydrochloride	00134-29-2
benz(a)anthracene	00056-55-3
benzene	00071-43-2
benzidine	00092-87-5
benzidine salts	Class-08-7
benzo(a)pyrene	00050-32-8
brucine	00357-57-3
carbon tetrachloride	00056-23-5
chlorinated dibenzofurans	Class-05-3
chlorinated dioxins	Class-05-4
1-chloro-2,3-epoxypropane	00106-89-8
bis(2-chloroethyl)ether	00111-44-4
chloroform	00067-66-3
bis(chloromethyl)ether	00542-88-1
3-(chloromethyl)pyridine hydrochloride	06959-48-4
1-(4-chlorophenyl)-3, 3-dimethyl triazene	07203-90-9
4-chloro-m-phenylenediamine	05131-60-2
4-chloro-o-phenylenediamine	00095-83-0
chloroprene	00126-99-8
5-chloro-o-toluidine	00095-79-4
p-cresidine (5-methyl-o-anisidine)	00120-71-8
2,4-diaminoanisole sulfate	39156-41-7
4,4'-diaminodiphenyl ether	00101-80-4
2,4-diaminotoluene	00095-80-7
dibenz(a,h)anthracene	00053-70-3
tris(dibromopropyl)phosphate	00126-72-7
di-n-butyl phthalate	00084-74-2
3,3'-dichlorobenzidine	00091-94-1
3,3'-dichlorobenzidine salts	Class-08-8
1,2-dichloroethane	00107-06-2
1,2:3,4-diepoxybutane	00298-18-0
diethyl sulfate	00064-67-5
4-dimethylaminoazobenzene	00060-11-7
dimethylhydrazines	Class-06-2
4,6-dinitro-o-cresol	00534-52-1
2,4-dinitrophenol	00051-28-5
2,4-dinitrotoluene	00121-14-2
di-n-octyl phthalate	00117-84-0
1,4-dioxane	00123-91-1
2,3-epoxy-1-propanal	00765-34-4
ethylene dibromide	00106-93-4
ethyleneimine	00151-56-4
ethylene oxide	00075-21-8
ethylene thiourea	00096-45-7
bis(2-ethylhexyl)phthalate	00117-81-7
ethylmethanesulfonate	00062-50-0
2-(2-formylhydrazino)-4-(5-nitro-2-furyl)-thiazole	03570-75-0
hexachlorobenzene (HCB)	00118-74-1
hexachlorobutadiene	00087-68-3
hexachlorocyclohexane	00608-73-1
hexachlorocyclopentadiene	00077-47-4
hexachloroethane	00067-72-1
hydrazobenzene	00122-66-7
hydroquinone	00123-31-9
N-(2-hydroxyethyl)ethyleneimine	01072-52-2
lactonitrile	00078-97-7
malachite green (C.I. Basic Green 4)	00569-64-2

* indicates new critical material

Table 3.3 (con't.)

Organic Materials (continued)	Parameter Number
methylenebis(2-chloroaniline)	00101-14-4
4,4'-methylenebis(2-methylaniline)	00838-88-0
4,4'-methylenebis(N,N-dimethylaniline	00101-61-1
1,2-(methylenedioxy)-4-propenyl benzene	00120-58-1
methyl hydrazine	00060-34-4
** methyl mercaptan	00074-93-1
1-methylnaphthalene	00090-12-0
2-methyl-1-nitroanthraquinone	00129-15-7
mustard gas	00505-60-2
1,5-naphthalenediamine	02243-62-1
1-naphthylamine	00134-32-7
2-naphthylamine	00091-59-8
5-nitroacenaphthene	00602-87-9
5-nitro-o-anisidine	00099-59-2
4-nitrobiphenyl	00092-93-3
nitrogen mustard	00051-75-2
N-nitroso-n-butyl-N-(4-hydroxybutyl) amine	03817-11-6
* N-nitroso-di-n-butylamine	00924-16-3
N-nitrosodiethylamine	00055-18-5
N-nitrosodimethylamine	00062-75-9
p-nitrosodiphenylamine	00156-10-5
N-nitroso-N-ethylurea	00759-73-9
N-nitroso-N-methylurea	00684-93-5
N-nitroso-N-methylurethane	00615-53-2
N-nitrosomorpholine	00059-89-2
N-nitroso-N-phenylhydroxylamine, ammonium salt	00135-20-6
N-nitrososarcosine	13256-22-9
pentachloronitrobenzene	00082-68-8
pentachlorophenol	00087-86-5
peroxyacetic acid	00079-21-0
piperonyl sulfoxide	00120-62-7
polybrominated biphenyls (PBB)	Class-07-8
polychlorinated biphenyls (PCB)	Class-07-9
1,3-propane sultone	01120-71-4
β-propiolactone	00057-57-8
5-propyl-1,3-benzodioxole	00094-58-6
propyleneimine	00075-55-8
semicarbazide	00057-56-7
styrene	00100-42-5
* 1,1,2,2-tetrachloroethane	00079-34-5
tetrachloroethylene (perchloroethylene)	00127-18-4
thioacetamide	00062-55-5
4,4'-thiodianiline	00139-65-1
thiourea	00062-56-6
o-toluidine	00095-53-4
o-toluidine hydrochloride	00636-21-5
triaryl phosphate esters	Class-08-4
1,1,2-trichloroethane	00079-00-5
trichloroethylene	00079-01-6
trichlorophenols	Class-07-6
2,4,5-trimethylaniline	00137-17-7
trimethylphosphate	00512-56-1
xylene	01330-20-7

III. Pesticides (to be reported only by manufacturers and formulators).

	Parameter Number
aldicarb	00116-06-3
aldrin	00309-00-2
4-aminopyridine	00504-24-5
anilazine	00101-05-3
antimycin A	01397-94-0
azinphos-ethyl	02642-71-9
azinphos-methyl	00086-50-0
barban	00101-27-9
bendiocarb	22781-23-3
benomyl	17804-35-2
bromoxynil	01689-84-5
2-(p-*tert*-butylphenoxy)-isopropyl-2-chloroethyl sulfite	00140-57-8
captafol	02425-06-1
captan	00133-06-2
carbaryl	00063-25-2
carbofuran	01563-66-2
carbophenothion	00786-19-6
chlordane	00057-74-9
chlordecone	00143-50-0
chlorfenvinphos	00470-90-6
chlorobenzilate	00510-15-6
chlorpyrifos	02921-88-2
clonitralid	01420-04-8
coumaphos	00056-72-4
crotoxyphos	07700-17-6
cycloheximide	00066-81-9
DDT	00050-29-3
demeton	08065-48-3
diallate	02303-16-4
diazinon	00333-41-5
dibromochloropropane (DBCP)	00096-12-8
dichlone	00117-80-6
dichlorvos	00062-73-7
dichrotophos	00141-66-2
dieldrin	00060-57-1
dimethoate	00060-51-5
dinocap	39300-45-3
dinoseb	00088-85-7
dioxathion	00078-34-2
disulfoton	00298-04-4
endosulfan	00115-29-7
endrin	00072-20-8
EPN	02104-64-5
ethion	00563-12-2
fensulfothion	00115-90-2
fenthion	00055-38-9
fluchloralin	33245-39-5
heptachlor	00076-44-8
heptachlor epoxide	01024-57-3
leptophos	21609-90-5
malathion	00121-75-5
methomyl	16752-77-5
methoxychlor	00072-43-5
methyl parathion	00298-00-0
mevinphos	07786-34-7
mexacarbate	00315-18-4
mirex	02385-85-5
monocrotophos	06923-22-4
naled	00300-76-5
nicotine	00054-11-5
nitrofen	01836-75-5
oxydemeton-methyl	00301-12-2
paraquat	01910-42-5
parathion	00056-38-2
phorate	00298-02-2
phosazetim	04104-14-7
phosmet	00732-11-6
phosphamidon	13171-21-6
rotenone	00083-79-4
silvex, propylene glycolbutyl ether ester	02317-24-0
sodium fluoroacetate	00062-74-3
strychnine	00057-24-9
sulfallate	00095-06-7
sulfotepp	03689-24-5
TDE	00072-54-8
TEPP	00107-49-3
terbufos	13071-79-9
tetrachlorvinphos	00961-11-5
thiram	00137-26-8
toxaphene	08001-35-2
trichlorfon	00052-68-6
trichlorophenoxyacetic acid (2,4,5-T)	00093-76-5
trifluralin	01582-09-8
ziram	00137-30-4

IV. Drugs, Food Additives, Natural Materials (to be reported only by manufacturers and formulators).

	Parameter Number
actinomycin D	00050-76-0
citrus red no. 2	06358-53-8
cycasin	14901-08-7
cyclophosphamide	00050-18-0
diethylstilbestrol	00056-53-1
isonicotinic acid hydrazine	00054-85-3
lasiocarpine	00303-34-4
mestranol	00072-33-3
methylthiouracil	00056-04-2
mitomycin C	00050-07-7
monocrotaline	00315-22-0
niridazole	00061-57-4
nithiazide	00139-94-6
N-[4-(5-nitro-2-furanyl)-2-thiazolyl]acetamide	00531-82-8
phenazopyridine hydrochloride	00136-40-3
phenesterin	03546-10-9
phenobarbitol	00050-06-6
phenytoin	00057-41-0
phenytoin sodium	00630-93-3
propylthiouracil	00051-52-5
uracil mustard	00066-75-1

* indicates new critical material

** previously included with pesticides

assessment of chemicals by July 1. These chemicals include those submitted for inclusion or subject to exclusion, based on current scientific data, to the CMR. After Committee approval, the CMR is final typed, checked for accuracy and forwarded to the DNR Director for approval. The approved CMR is published on October 1 in the Wastewater Reporting Booklet. New chemicals added to the list need be reported only after a one year grace period.

Should industry or any other group have data which refutes the placement of a chemical on the CMR, a formal appeal of that decision may be made. The appeal is made to the DNR Director and must be accompanied by adequate substantiating data and references. Data supplied is reviewed and evaluated by the Office of Toxic Materials Control and the Critical Materials Advisory Committee. If the appeal is found to be valid, the chemical is removed from subsequent years' CMR. If the appeal is denied, the specific reasons for the denial are given.

The purpose of the CMR is to develop and maintain a list of chemicals of high environmental concern from a water-oriented point of view. Presently, inhalation data is given only minor consideration in the hazard assessment process since the authority for the CMR is based on water-related legislation. The goal of the overall CMR program is to provide information on the use and discharge of toxic substances which can be utilized to prevent and control pollution of the aquatic environment by these substances.

It is necessary to reach a reasonable compromise between the number of compounds included in the Register and the impact on people reporting under the law. Careful consideration must be given to future use of these data to prevent unnecessary data collection and to assure that the data can be adequately compiled and utilized. The CMR was developed for a specific purpose, thus it is not applicable to all situations where lists of toxic or hazardous chemicals are needed. No attempt has been made to include all chemicals on the CMR which may be toxic or hazardous under some conditions. Such a list would be very lengthy and it is doubtful that it would ever be complete.

Other enforcement tools are available in Michigan to control toxic substances not covered by the CMR program. These tools include provisions of Act 245, P.A. 1929, as amended (Michigan's Water Resources Commission Act); Act 348, P.A. 1965 (Air Pollution Act); Act 116, P.A. 1978 (Toxic Substances Control Commission Act); Act 641, P.A. 1978 (Solid Waste Act); and Act 64, P.A. 1979 (Hazardous Waste Management Act). Michigan's permit programs (Air, Groundwater, Surface Water) are used to limit the quantities of toxic substances entering the environment.

In addition to reviewing chemicals for water pollution control, the 1979 CMR assessment process was expanded to consider potential hazards from air pollutants. A separate list, entitled the "1979 Air Priority Chemicals List", was developed which is composed of the 1979 CMR plus other selected chemicals producing adverse effects from inhalation exposure. The Air Priority Chemicals assessment process was continued in 1980 and the 1980 Air Priority Chemicals List was developed. This group of chemicals will be used to monitor usage and emission of air pollutants to the environment.

3.3. Critical Materials Advisory Committee

Pursuant to Section 6(b) of Act 293, P.A. 1972, an advisory committee of environmental specialists is designated by the Director of the Department of Natural Resources to provide advice to the Director on the development and revision of the Critical Materials Register Program. The Committee also provides advice and recommendations on the development of the general program. The Committee is composed of representatives from academia, industry, state government and special interest groups.

The Advisory Committee concept has proven very beneficial in the development of the Critical Materials Program. The wide range of backgrounds represented on the Committee has been an asset to staff in all stages of development and implementation of the register and reporting system. The advisory committee can also be used os a sounding board for problems brought to the agency by the reporting industries. This approach allows DNR staff to anticipate and avoid many potential problems by promoting clear communication between the agency and the reporting industries. These factors have also increased compliance with the program.

3.4. Selection of Chemicals for Review

The 1977 Critical Materials Advisory Committee recognized the need for an extensive review of chemical compounds that were not included on previous Registers. At that time, there were an estimated 4,000,000 known chemicals. Approximately 50,000 chemicals were in common use (excluding pesticides, pharmaceuticals and food additives). Only a small subset of possible candidates could be selected for detailed consideration because of the large number of compounds in existence, the lack of a comprehensive and readily accessible data base on many chemicals, and the limited amount of time and staff. In order to review compounds of highest concern, the committee chose to limit its initial consideration to compounds or classes of compounds which had been identified in previous reviews. Compounds included in these reviews had potential adverse effects on human health or the environment, or large production volumes and consequent potential for substantial human exposure or environmental release. Eight separate source lists of this type were identified (Table 3.4). These lists, along with the 1976 CMR formed the basis of the "Proposed List of Hazardous Materials to be Screened for the 1977 Critical Materials Register". This combined list had approximately 400 entries which included specific compounds and classes of compounds. All of these compounds were reviewed for the 1977 Critical Materials Register.

Table 3.4. Chemical Lists Utilized for 1977 CMR Revision.

Potential Industrial Carcinogens and Mutagens, National Center for Toxicological Research. (90 chemicals)

Persistent Toxic Substances, International Joint Commission. (57 chemicals or classes)

List of Hazardous Substances, U.S. Environmental Protection Agency. (306 chemicals)

General Agreement - Restricted Pesticide List, December, 1976, U.S. Environmental Protection Agency. (81 chemicals)

List of Priority Pollutants, U.S. Environmental Protection Agency. (129 chemicals)

(Table 3.4 con't.)

Toxic Pollutant List, Prepared by Tracor, Jitco, Inc. for the U.S. Environmental Protection Agency. (226 chemicals)

List of Substances of Concern, State of New York, Department of Environmental Conservation. (135 chemicals or classes)

OSHA Standards for Carcinogens, Occupation Safety and Health Administration. (14 chemicals)

The same procedure was used for the 1978 CMR revision. Two separate source lists (Table 3.5), a list of hazardous compounds compiled from information reported in the Federal Register, and a list of compounds identified by the Office of Toxic Materials Control staff as possible candidates for the 1978 CMR were used to compile the "List of Priority Chemical Substances for Further Evaluation by the 1978 CMR Advisory Committee". Approximately 350 compounds or classes of compounds were included on this list. A total of 200 compounds from this list were evaluated for the 1978 CMR. In addition, the 218 compounds or classes of compounds on the 1977 CMR were re-evaluated to obtain additional information required for the newly amended hazard assessment scoring procedure.

Table 3.5. Chemical Lists Utilized for 1978 CMR Revision.

TSCA Preliminary List, U.S. Environmental Protection Agency. (300 compounds or classes of compounds)

Preliminary Possible Pollution List, U.S. Environmental Protection Agency, Region V. (38 specific chemicals)

The Critical Materials Advisory Committee evaluated a total of 289 compounds and classes of compounds for the 1979 CMR. These included the 190 compounds and classes of compounds on the 1978 CMR and 99 additional chemicals which were selected as possible candidates for the 1979 CMR. Four separate source lists (Table 3.6) and a list of compounds selected by the Office of Toxic Materials Control staff for further evaluation were used to compile this list of CMR candidates.

Table 3.6. Chemical Lists Utilized for 1979 CMR Revision.

List of Chemical Contaminants in the Great Lakes; Table I & II. International Joint Commission, Great Lakes Water Quality Board Status Report, Appendix E. (50 chemicals)

Scoring of Organic Air Pollutants. Prepared by MITRE Corporation for the U.S. Environmental Protection Agency. EPA-450/3-77-00814. (637 chemicals)

Preliminary List of Chemicals Submitted for Air Pollution Exposure Studies. U.S. Environmental Protection Agency. (40 chemicals)

List of Chemicals with Time Weighted Average Exposure Limits for Occupational Exposure in the Workplace. Occupational Safety and Health Administration. (360 chemicals and classes)

The Advisory Committee selected 259 chemicals for the "List of Priority Chemical Substances for Further Evaluation by the 1980 CMR Advisory Committee". Major emphasis for the 1980 CMR revision was placed on chemicals recognized as carcinogens. Chemicals chosen for this list included 103 compounds selected from the chemicals evaluated by the International Agency for Research on Cancer and 60 compounds selected from the chemicals tested by the National Cancer Institute. Additionally, 48 chemicals designated by the staff of the Office of Toxic Materials

Control as potential hazardous substances and 48 compounds selected for inhalation toxicity concerns were included on the list. A total of 223 compounds from this list were evaluated for the 1980 CMR.

Over 2,000 chemical compounds or classes of compounds have been reviewed, and of those approximately 750 have been hazard assessed for possible inclusion on the CMR.

3.5. Chemical Evaluation Procedure

Chemical evaluations for the Critical Materials Register consist of literature searches on the physical, chemical, and toxicological properties of those chemcials selected for review from the various lists of priority chemicals noted in the preceding section or chemicals which pose potential problems in Michigan.

The procedure begins with the assignment of a literature researcher. The chemical is identified by the "most commonly used" name and the International Union of Pure and Applied Chemists (IUPAC) name. The Chemical Abstract Service number is also determined. The most commonly used in-house references (Table 3.7) are used to define basic physical characteristics and develop an overview of toxicity and other adverse effects. From this point, the remaining office references (i.e. collected journal articles, texts, etc.) are reviewed. The various sections of the State of Michigan, Michigan State University, and the University of Michigan libraries dealing with chemicals and chemical toxicants are used to complete the literature summary. Chemical Abstracts, Pesticide Abstracts International Agency for Research on Cancer Monographs, National

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Cancer Institute reports, NIOSH Criteria Documents, U.S. Environmental Protecton Agency criteria reports, etc., are reviewed. Various computer searches of on-line data systems are conducted to supplement the manual collection of scientific data. They include EPA-NIH's Chemical Information System, Lockheed's Dialog System and the National Library of Medicines' MEDLARS system.

Literature researchers record all pertinent data on the chemicals and obtain copies of the original articles on carcinogenicity, teratogenicity, mutagenicity, or chronic adverse effects. Articles are also obtained on other detailed information pertinent to an adequate chemical evaluation.

The completed evaluation includes the best available chemical and toxicological information with this information properly referenced. The evaluation is then reviewed for accuracy, references, and toxicity data.

3.6. Hazard Assessment Process

The hazard assessment process, a priority ranking-point assignment system, is used to evaluate compounds for possible inclusion on the CMR. This system is summarized on the 1980 CMR Hazard Assessment Sheet (Table 3.2). The goal of the 1978 and subsequent 1979 revisions was to increase the objectivity of the hazard assessment process to better balance the degree of emphasis placed on each factor considered. Factors of environmental concern for potentially deleterious substances are separated into seven specific areas: 1) acute toxicity, 2) carcinogenicity, 3) hereditary mutagenicity, 4) teratogenicity, 5) persistence, 6) bioaccumulation, and 7) other adverse effects (including subacute and chronic effects to terrestrial and aquatic life, phytotoxicity and aesthetics). Adverse effects of metabolites or degradation products are evaluated as properties of the parent chemical. Should these metabolites or degradation products meet the criteria for placement on the register, the parent compound is included on the CMR. Criteria and rationale for each factor are presented in section 3.7.

Each category within the seven individual factors has been assigned a point value commensurate with its level of environmental concern in keeping with the overall objectives of the program. A score of seven points in one factor or a cumulative score of seven or more points in several factors includes a chemical on the CMR. The scoring factors can be adjusted to reflect changing priorities or objectives, and to control the final composition of the list. The factors which potentially have the most severe adverse impacts on the environment and human health (acute toxicity, carcinogenicity, hereditary mutagenicity, teratogenicity, bioaccumulation and low dose adverse effects) may receive a maximum score of seven. Those factors which can receive a score of seven represent a very high level of concern and are restrictively defined in the Criteria and Rationale. Other factors which are of relatively lower concern receive correspondingly lower point values and are less restrictively defined in the Criteria. Persistence is of high concern since, through longer exposure, it may increase the impact of other factors. Therefore, it receives a higher rating (number of points) than might seem justified at first. Aesthetic effects may have significant adverse impacts on the value and usefulness of aquatic systems. However, aesthetics have been scored at a lower level since their effects are of lower concern than the more critical biological effects. Phytotoxicity receives a lower rating primarily due to a lack of consistent research methodologies and damage measurements.

The actual process of scoring the chemical on the Hazard Assessment Sheet must be carefully and accurately conducted to insure the integrity of the program. Each factor in the Hazard Assessment Process is scored for all the chemical substances reviewed. All available data is fully evaluated to determine its validity, before being placed in the appropriate category for scoring. Often, the original research publications must be obtained before a decision can be made. Staff of the DNR or members of the Advisory Committee may then make decisions on the adequacy of the testing methods, statistical analyses, and data interpretation. Experience has shown that caution must be exercised when material from summary papers, second hand references to the work of others, or references such as the Registry of Toxic Effects of Chemical Substances are used. It appears that the rate of error or misinterpretation of data in these types of publications is quite high. It is advisable to obtain copies of the original publications whenever possible and use those data to conduct the hazard assessment.

3.7. Hazard Assessment Criteria and Rationale

3.7.1. Acute Toxicity

CRITERION:

SCORE	ORAL LD50	DERMAL LD50	AQUATIC 96 HR LC50
7 Extremely Toxic	5 mg/kg	5 mg/kg	1 mg/l
3 Highly Toxic	5-50 mg/kg	5-200 mg/kg	1-10 mg/l

2	Moderately Toxic	50-500 mg/kg	200-500 mg/kg	10-100 mg/l
1	Slightly Toxic	0.5-5 g/kg	0.5-5 g/kg	100-1000 mg/l
0	Relatively Nontoxic	5 g/kg	5 g/kg	1000 mg/l
*	Insufficient Information			

RATIONALE:

Classification is based upon generally accepted terminology found in the available literature on acute toxicity. The critical levels describing "highly toxic" for oral, dermal, and aquatic LC50s are adapted from Battelle Memorial Institute, National Academy of Sciences, State of California List of Toxic Substances, Federal Water Pollution Control Agency, Pesticides-Title 40, Department of Transportation Title 49, Consumer Product Safety Commission, and the Federal Hazardous Substances Labeling Act Title 15 classificaitons (EPA, 1978), as well as systems presented by Hodge and Sterner (1949). Levels of "moderate", "slightly" and "relatively nontoxic" are adapted from the National Academy of Sciences (EPA, 1975), Hodge and Sterner (1949) and Gleason, *et al*. (1977).

Data available for each category for each type of exposure (i.e. oral, dermal, aquatic) are scored independently. The score assigned to the acute toxicity factor is the highest score given to any individual category. For example, a chemical substance which has an oral LD50 of 5-50 mg/kg, a dermal LD50 of 200-500 mg/kg, and an aquatic 96 hr LC50 of less than 1 mg/l is assigned a score of seven based on the extreme aquatic toxicity.

3.7.2. Carcinogenicity

CRITERION:

SCORE	CATEGORY
7	The chemical has been demonstrated to be a human positive, potential human, or animal positive carcinogen (defined below) by the oral or dermal route of exposure based on data reported by the International Agency for Research on Cancer (IARC), National Cancer Institute (NCI), or National Institute for Occupational Safety and Health (NIOSH).
3	The chemical has been demonstrated to be a potential animal carcinogen (defined below) by the oral or dermal route of exposure.
2	The chemical has been demonstrated to be an animal positive or potential animal carcinogen by any route other than oral or dermal; or has been demonstrated by accepted mutagenicity screening tests or accepted cell transformation studies to be a strongly suspect carcinogen (defined below).
1	The chemical has been demonstrated by accepted mutagenicity tests or accepted cell transformation studies to be a suspect carcinogen (defined below).
0	The chemical has been tested by the above systems and has not been demonstrated to cause cancer or to be a suspect carcinogen.
*	Insufficient information.

RATIONALE:

Most cancers are believed to be caused by exposure to extrinsic factors, among which chemical agents are thought to be a major contributor. These agents must be identified, evaluated, and controlled if the incidence of cancer is to be reduced. An essential part of the Michigan Critical Materials Program is the need to protect the public and environment from chemical carcinogenic hazards and their effects. In an effort to meet this need, this carcinogenicity criterion was developed.

In addition to the standard long-term carcinogenicity test, a great deal of research is being conducted to develop rapid test methods. At present, there are two quick test systems that are of most interest, the cell transformation test and the mutagenicity test. The cell transformation test is based on the actual transformation of *in vitro* cultures of normal mammalian cells into tumor cells by brief exposure of these cell cultures to small amounts of carcinogenic agents. When the transformed cells are implanted into an animal of the species and strain from which the original normal cells were harvested, they develop into malignant tumors. The basis for the mutagenicity test is the hypothesis that carcinogenesis, like mutagenesis, is due to damage of the hereditary material of the cell, DNA. The Ames test, which uses certain mutants of the bacterium *Salmonella typhimurium* is a well-known example of one of the mutagenicity tests designed to show carcinogenic potential (Bartsch, 1976; Fishbein, 1977; McCann, *et al*., 1975).

It is essential that the procedures used to determine a chemical's carcinogenicity potential be established on the best scientific basis practically possible. For the purpose of the Michigan Critical Materials Register, chemicals are classified as human positive, potential human, and animal positive carcinogens according to data and interpretation as reported by the IARC, NCI, or NIOSH (IARC; Sontag, *et al*., 1976; Tomatis, 1976; USHEW). Chemicals are placed in the other carcinogenicity categories according to the best information available in the scientific literature. Chemicals can be reclassified to appropriate categories as additional data become available.

For the purpose of the Michigan Critical Materials Register, the categories of carcinogenic effects are defined as follows:

I. Human positive carcinogens are chemicals which have been demonstrated by epidemiological and/or clinical studies to cause cancer in man.

II. Potential human carcinogens are chemicals which are animal positive carcinogens and have been suggested to cause cancer in man but adequate epidemiological and/or clinical data are not available at the present time to unequivocally substantiate their carcinogenic effect in man.

III. Animal positive carcinogens are chemicals which have been demonstrated to cause cancer in at least one animal species in replicate studies or demonstrated to cause cancer in more than one animal species.

IV. Potential animal carcinogens are chemicals which have been tested in a nonreplicated study and shown to cause cancer in one animal species.

V. Strongly suspect carcinogens are chemicals which fit one of the following descriptions:

1. The chemical has been shown, using mutagenicity or cell transformation tests (with or without enzyme activation) designed to demonstrate carcinogenic potential, to be mutagenic in three groups of organisms (or cell cultures from three groups) not to include more than:
    a. one lower test organism (i.e. bacteria, yeast, fungi)
    b. one plant test organism (including algae)
    c. two species of mammalian test organisms
    d. one insect test organism

    e. one macroscopic aquatic or semi-aquatic organism.

  2. The chemical has been shown to transform normal human cells (e.g. diploid fibroblasts) into tumor cells in replicated tests designed to demonstrate carcinogenic potential.

VI. Suspect carcinogens are chemicals which fit one of the following descriptions:

  1. The chemical has been shown, using mutagenicity or cell transformation tests (with or without enzyme activation) designed to demonstrate carcinogenic potential, to be mutagenic in any one organism (or cell culture from any organism).

  2. The chemical has been shown to transform normal human cells (e.g. diploid fibroblasts) into tumor cells in unreplicated tests.

3.7.3. Hereditary Mutagenicity

CRITERION:

SCORE	CATEGORY
1	Confirmed hereditary mutagen.
4	Potential hereditary mutagen in multicellular organisms.
2	Potential hereditary mutagen in micro-organisms.
0	Not demonstrated to be a hereditary mutagen.
*	Insufficient information.

RATIONALE:

On a theoretical basis, mutagens can produce significant effects on the long-term survival of any species. In spite of this significant potential impact, effects due to mutagenic substances in nature might not be discernible for a long time (deSerres and Sheridan, 1973).

Most tests for mutagenicity have been designed to maximize their predictive value for carcinogenicity. The present criterion has been selected to emphasize mutagenic effects. Such mutagens represent a high level of environmental and human health concern (Canadian Ministry of Health and Welfare, 1975) and are included in the Critical Materials Register.

For the purpose of the Michigan Critical Materials Register, the classification of Hereditary Mutagens to specific categories is defined below:

> To be a confirmed hereditary mutagen, a chemical must produce a statistically significant dose related mutagenic effect in test microorganisms without the use of metabolic activators (i.e. rodent liver fractions, etc.) and in a complex multicellular animal (i.e. insect, rodent, etc.) with mutations inheritable in subsequent generations of the test organisms.
>
> To be a potential hereditary mutagen in a multicellular organism, a chemical must produce a statistically significant dose related mutation in a complex multicellular organism (i.e. plants, insects, rodents, etc.) with mutations inheritable in subsequent generations of the test organism.
>
> To be a potential hereditary mutagen in microorganisms a chemical must produce a statistically significant dose related mutation in exposed test microorganisms with mutations inheritable in subsequent

generations.

A chemical is not considered to be a hereditary mutagen if it has been adequately tested in several appropriate animal species with negative findings.

3.7.4. Teratogenicity

CRITERION:

SCORE	CATEGORY
7	Confirmed Teratogen.
3	Potential Teratogen.
0	Not Teratogenic.
*	Insufficient information.

RATIONALE:

Since terrestrial and aquatic populations are exposed to a wide variety of chemicals in the environment on a continuing or chronic basis, recognition and control of teratogens is necessary to prevent repetition of incidences such as Minimata disease and the "thalidomide disaster". A teratogen is any chemical which causes alterations in the formation of cells, tissues, and organs resulting from physiologic and biochemical changes, i.e. generative changes. Teratogenic change occurs during embryogenesis and may affect the function as well as the structure of developing cells, tissues, and organs (Becker, 1975; Canadian Ministry of Health and Welfare, 1975).

A chemical is classified as a confirmed teratogen if it has been shown by epidemiological evidence to be teratogenic in humans, demonstrated to be teratogenic in two animal species by the oral or dermal route of exposure (USEPA, 1978) or demonstrated in one animal species in replicate studies to be teratogenic by the oral or dermal route of exposure.

To be categorized as a potential teratogen the chemical must be teratogenic in one animal species by oral or dermal route in an unreplicated study.

A chemical is not considered to be teratogenic if it has been adequately tested in several appropriate animal species with negative findings (USEPA, 1978).

A confirmed teratogen would be placed on the CMR list automatically. The ranking system for suspect teratogens is more lenient to allow for lack of information and consideration of other concerns about the chemical. Should conflicting studies be found, review of the research procedures will be made to evaluate the adequacy of the study and validity of the results.

3.7.5. Persistence

CRITERION:

SCORE	CATEGORY	t 1/2 in weeks (soil or water)
4	Very persistent	52
3	Persistent	40 - 52
2	Slowly degradable	27 - 39
1	Moderately degradable	14 - 26
0	Readily degradable	0 - 13
*	Insufficient information	

RATIONALE:

A major factor for assessing the potential hazard of an environmental contaminant is consideration of its environmental persistence. Many synthetic compounds are highly resistant to natural degradation processes (i.e. biodegradation, photochemical degradation, chemical degradation) and may persist and accumulate in the environment. Continuous exposures to some substances, even at low concentrations, may result in chronic toxic effects on organisms and cumulative effects on populations. In addition, the longer a substance persists, the greater the opportunity for it to bioaccumulate to toxic levels in organisms. Of equal importance, persistent substances also have the potential for wider dispersal in the environment.

Several techniques for studying persistence and degradation of chemical substances in the environment are reported in the literature (Draggan and Giddings, 1978; Howard, et al., 1975; U.S. EPA, 1979; U.S. EPA, 1978; U.S. EPA, 1975; Witherspoon, et al., 1976). The design of experimental procedures for environmental persistence testing is often made on an individual chemical basis and is extremely variable. In contrast to many toxicity testing methods, techniques for studying the fate of chemicals in the environment are not standardized and interpretation of test results frequently varies. This makes it difficult to compare persistence data between chemicals.

Due to the lack of standardization among test protocols, only data obtained from test systems designed to closely simulate the natural soil or water environment are used for the persistence hazard assessment. Test systems are evaluated by DNR staff and the Critical Materials Advisory Committee. Data in the form of the half-life (t 1/2) of the chemicals in soil or water are used in order to allow for comparison between chemicals.

Time ranges for each category of persistence were selected based on data for pesticides. The very persistent category (t 1/2 = 52 weeks) includes many of the chlorinated hydrocarbon insecticides (e.g. DDT, aldrin, lindane) while the readily degradable category (t 1/2 = 0-13 weeks) includes many of the organophosphorus insecticides (e.g. dichlorvos, disulfoton, malathion) (Brown, 1978). It must be emphasized that the environmental persistence criterion was developed on information currently available. The criterion will be modified as new information and testing methodologies become available.

3.7.6. Bioaccumulation

CRITERION:

	CATEGORY	
SCORE	BIOACCUMULATION	LOG P
7	4000	6.00
3	1000 - 3999	5.00 - 5.99
2	700 - 999	4.50 - 4.99
1	300 - 699	4.00 - 4.49
0	300	4.00
*	Insufficient information.	

RATIONALE:

Partition coefficients for n-octanol/water are often used as a reliable measure of the tendency for an organic compound to transfer from water to organisms (lipid phase) and bioaccumulate. The n-octanol/water partition coefficient, P, is defined as the ratio of the concentration of a compound in octanol to its concentration in water. It is generally expressed as the log (base 10) of the partition coefficient, log P. The partition coefficient has proven useful as a means of predicting soil adsorption (Briggs, 1973), biological uptake (Kenaga, 1972; Hamelink, et al., 1977), lipophilic storage (Davids, et al., 1975), and biomagnification (Lu, et al., 1975; Metcalf, et al., 1973; Metcalf, et al., 1975; Neely, et al., 1974). These studies have shown a direct relationship between log P values and log bioconcentration factors for organic compounds.

Highly bioaccumulative compounds have log P values greater than 5.0. Examples of these include DDT; DDE; 2,4,5,2',5'-PCB; 2,4,5,2',4',5'-PCB; and leptophos with log P values of 6.19, 5.69, 6.11, 6.72, and 6.31, respectively (Chiou, et al., 1977). Compounds which bioaccumulate to a lesser degree, such as monochlorobenzene, tetrachloroethylene, dicapthon, and diphenyl ether have log P values of 2.18, 2.60, 3.58, and 4.20, respectively (Chiou, et al., 1977; Ware et al., 1977).

Log P values greater than 6.0 must be interpreted carefully before being utilized as a bioaccumulation indicator. An increase in the log P value correlates with increased propensity for bioaccumulation for many classes of chemicals. However, for certain groups of chemicals, large log P values (i.e. greater than 6.0) do not correlate to an increased tendency to bioaccumulate (Tulp and Hutzinger, 1978). For example, apolar polymers (such as plastics) have computed log P values that are very large, yet they are not bioaccumulated. Squalene, an isoprenoid hydrocarbon, is excreted quantitatively in the feces of rats after an oral dosage. The compound is not absorbed from the intestine, yet its computed log P value is 15.5. Additionally, some chemicals having large log P values are readily metabolized and not bioaccumulated. An organic chemical that has a log P greater than or equal to 6.0 must have the potential to bioaccumulate before it receives a score of seven points.

An organic chemical that has a log P greater than or equal to 6.0 which has the potential to bioaccumulate, and for which no data on bioaccumulation in fish is available; or a chemical that bioaccumulates greater than or equal to 4,000 times in fish (wet weight basis) at equilibrium receives a score of seven points for the bioaccumulation category.

A chemical that has a log P less than 6.0, which has the potential to bioaccumulate and for which no data on bioaccumulation in fish is available; or a chemical that bioaccumulates less than 4,000 times in fish (wet weight basis) at equilibrium is scored as listed above.

3.7.7. Other Adverse Effects

The Other Adverse Effects factor is divided into three subfactors for the purpose of evaluating the available data and assigning points. Each subfactor is assigned an individual score. The score assigned to the Other Adverse Effects factor is the combined scores of the three individual subfactors. Other Adverse Effects on terrestrial animals and aquatic organisms are considered in a single subfactor to be consistent with the acute toxicity criterion. The score assigned to this subfactor is the highest score given to any individual category. For example, a chemical substance which causes irreversible effects to mammals at a very low dose and has an aquatic median effective concentration of 1 mg/l is assigned a score of seven based on the toxicity to mammals.

A. TERRESTRIAL ANIMALS AND AQUATIC ORGANISMS

1. TERRESTRIAL ANIMALS

CRITERION:

SCORE	CATEGORY
7	Produces an irreversible effect at a very low dose (i.e. 0.5 mg/kg) by oral or dermal routes.
3	Irreversible effects during or following cessation of low level exposure by oral or dermal routes.
2	Reversible effects following cessation of low level exposure by oral or dermal routes.
1	Adverse effects by inhalation route.
0	No detectable adverse effects.
*	Insufficient information.

RATIONALE:

Environmental dispersion and dilution of deleterious chemicals may present adverse biological impacts at concentrations other than those necessary to cause death of 50% of observed populations. Prolonged exposure or sublethal adverse effects must be addressed since these doses present the predominant environmental contamination circumstances. These lower dosage levels may produce reversible or irreversible effects. Reversible and irreversible effects in most cases are dose dependent. Lower level doses may produce reversible effects, whereas higher doses of the same chemical may cause irreversible effects (McRae, _et_ _al_., 1978). Except for the extremely low dose category receiving seven points, exact numerical exposure cut-off points have not been included in order to allow flexibility in evaluating what concentrations could realistically occur in the environment and judgement of the applicability and validity of the data reviewed. For the sake of the Critical Materials Program the following definitions apply.

Irreversible Adverse Effects (Casarett and Doull, 1975; Robbins and Angell, 1971): continued or intermittent, oral or dermal (including occular) exposure that results in *irreversible* impairment of anatomical, physiological, biochemical, or behavioral functions during exposure or following cessation of exposure. Examples would include but not be limited to:

Benign neoplasias

Induced autoimmunity

Embryo or fetal mortality

Hypersensitivity

Metabolic disorders (i.e. hyper/hypoglycemia, hypo/hyperthyroidism)

Cellular necrosis causing permanent reduction of normal system, organ, or tissue structure and/or function resulting in such disorders or damage as:

cataracts
glaucoma
glomerulonephritis
hepatic failure
arteriosclerosis

aplastic anemia
retinal degeneration
renal failure
cirrhosis
neuronal degeneration (demylenation)

sterility from testicular or ovarian atrophy, such as germinal aplasia leading to aspermia or azoospermia

NOTE: Carcinogenic, mutagenic, and teratogenic effects are excluded from this criterion since they have been addressed in their individual criteria.

Reversible Adverse Effects (Casarett and Doull, 1975; Robbins and Angell, 1971): continued or intermittent, oral, or dermal (including occular) exposure that results in *reversible* impairment of functional capacity, however, enhances the susceptibility of organisms to other deleterious environmental effects. Examples would include but not be limited to:

Cellular lipid, carbohydrate, or protein infiltration not resulting in cell death;

Enzyme or hormone inhibition (i.e. antiestrogenic properties, acetylcholinesterase inhibition).

Inflammation, and cellular necrosis followed by normal structure and/or function regeneration such as possible from:

hemolytic anemia
bone marrow suppression
vitamin deficiencies
thrombocytopenia
methemoglobinemia
skin or eye irritation (erythema and/or edema)
retinal hemmorhage
renal tubular necrosis
agranulocytosis
cerebral edema
narcosis
peripheral neuropathy

NOTE: A category for adverse effects caused by inhalation has been included to give credit to research which may indicate potential adverse effects that may be derived from other environmental exposure.

Besides dosage level, evaluation of environmental toxicity data must address two additional considerations: routes and duration of exposure. The most common exposure to terrestrial environmental contaminants by the water route would be skin or eye contact and ingestion. Sublethal skin and eye contact may elicit irritation, contact sensitization, ulceration, photosensitivity, pigmentary changes, nodules, vesicles, tumors, and a potential for absorption leading to systemic toxicity

(NAS, 1975).

Skin and eye damage assessments can be made with available testing methods. There are currently five types of primary skin irritation tests available. Two tests are of Haskell Laboratory design and the other three tests are procedures from federal regulations: the Federal Hazardous Substances Act and the Department of Transportation Class B poison and skin corrosion tests. The tests are designed to indicate localized reaction potential and range from minor erythema through edema to corrosive damage indicated by necrosis. Two common eye tests are available: The Haskell Eye Irritation Test and the Federal Hazardous Substances Act eye irritation tests.

Duration of exposure is the other major consideration in reviewing adverse effects data. Acute studies which signify a single exposure recorded as death or no death, have been addressed in the acute toxicity section. Other exposures may be classified as prolonged or chronic. For this assessment model, prolonged studies consist of repeated exposures to a substance which may last up to 90 days. These studies, often referred to as subacute, generally use a fraction of the dose found to produce lethality in an acute study. A prolonged study is designed to show cumulative toxic effects from relatively low level exposures. Such exposures may simulate environmental contact to toxicants from accidental spills of hazardous substances, pesticide applications, air pollution incidents, occupational exposures, or other types of incidents where effects may be graded as changes in biological parameters rather than an all or none response observed in acute studies.

Chronic studies, for this hazard assessment, consist of repeated exposure to a substance for longer than 90 days and may last the lifetime of the experimental animals. These studies are designed to simulate low level environmental exposure over the lifetime of the test organism. Results are expressed in biological effect measurements similarly to those for a prolonged study (McRae, _et al_., 1978).

Data on lethal effects resulting from acute, prolonged and chronic exposures are scored independently. However, only the single highest score based on lethal effects is counted in the overall hazard assessment score, unless it can be established that the causes of the acute, prolonged and chronic lethal effects differ toxicologically.

2. AQUATIC ORGANISMS

CRITERION:

SCORE	MEDIAN EFFECTIVE CONCENTRATION (EC-50)
7	0.1 mg/l
3	0.1 - 1 mg/l
2	1 - 10 mg/l
1	10 - 100 mg/l
0	100 mg/l
*	Insufficient information.

RATIONALE:

In addition to basic acute toxicity tests (i.e. 48-hr for invertebrates, 96-hr for fish), toxicity studies measuring effects of chemical exposure on the reproductive process and other sublethal effects (i.e. chronic tests) are essential to a comprehensive hazard assessment program. There are basically two types of chronic toxicity tests, partial and full. A partial chronic toxicity test is one which includes a critical portion of a test organism's life cycle while a full chronic test will minimally include one complete life cycle. Full life cycle and partial life cycle tests with fish and invertebrates have become quite common and typically provide lethality and growth results as well as effects on reproduction (e.g. spawning, gametogenesis, and hatching success) and other sublethal responses during the course of testing (Brungs and Mount, 1978). A description of seven standard chronic toxicity tests follows:

a. Fish Full Life Cycle Test (U.S. EPA, 1972a).

   This test allows exposure from newly hatched fry through reproduction and exposure of the next generation. It provides exposure during sensitive developmental stages and assesses the growth and the reproductive processes. A common standard test organism is the fathead minnow (*Pimephales promelas*) and the test takes approximately nine months to complete.

b. Fish Critical Life Stage Exposure Test (Macek and Sleight, 1977; McKim, 1977).

This test allows exposure during a very sensitive stage of the life cycle. The test starts with exposure of the organisms during most, preferably all, of the embryonic period and exposure of fry for a period of 30 days after hatching for warm water fish with embryogenic periods ranging from 1 to 14 days, and for 60 days after hatching for fishes with longer embryogenic periods (e.g. salmonids). Eggs from the standard test organisms, commonly fathead minnows (*P. promelas*), rainbow trout (*Salmo gairdneri*), or bluegill (*Lepomis macrochirus*), are utilized in this test. Each test requires approximately five to ten weeks for completion.

c. Partial Life Cycle (U.S. EPA, 1972b).

This test generally parallels the Fish Critical Life Stage Exposure Test described earlier, but makes appropriate modifications in exposure conditions because of the species and also starts with juvenile fish. The most common test organism for these studies is the brook trout (*Salvelinus fontinalis*).

d. Daphnia Chronic (Biesinger and Christensen, 1972; Biesinger, 1974; Adema, 1978; Canton and Adema, 1978).

This test is a full life cycle reproductive test which utilizes the freshwater invertebrates, *Daphnia magma* and *D. pulex*. The test requires only three weeks to complete.

e. Midge Chronic (Cairns, *et al.*, 1978).

This full life cycle reproductive test utilizes a variety of species of these widely distributed genera (e.g. Chironomus). Benthic organisms are easy to culture and use in an extensive program for evaluating compounds of limited solubility or those that tend to accumulate in sediments.

f. Algal Toxicity Tests (U.S. EPA, 1974, U.S. EPA, 1971).

A variety of tests have been developed which utilize algae as test organisms. Although algal tests are sufficiently short that they can be considered acute tests, most are in part multigeneration reproductive tests. No single published procedure for algal toxicity testing has gained wide acceptance, but recent candidates are usually patterned after the EPA Algal Assay Procedure (Bottle Test) developed to test for algal growth potential and limiting nutrient effects.

g. *Lemna* Inhibition (U.S. EPA, 1978).

The duckweed, *Lemna minor* has been used as a test organism for assessing the effects of chemical substances on aquatic macrophytes.

Aquatic chronic toxicity data from these tests are scored based on the median effective concentration. For the purpose of the Michigan Critical Materials Register the median effective concentration (EC-50) is defined as the concentration of a test material that causes 50 percent reduction of survival, growth, or reproduction of a test population, when statistically compared to a control population, within a chronic test period.

B. PLANT

CRITERION:

SCORE	WATER
3	0.5 mg/1
2	0.5 - 5 mg/1
1	5 - 50 mg/1
0	50 mg/1
*	Insufficient information.

RATIONALE:

Concern for plant toxicity is partially due to the adverse impact of water contaminants. Contaminated irrigation waters may have significant deleterious effects on both commercial and domestic plant growth. While it appears no standard testing procedures for terrestrial phytotoxicity have been published, data, and testing methodologies are available in literature (McKee and Wolf, 1963).

Battelle Pacific Northwest Laboratories describe a level of plant damage by use of a "mean inhibitory limit" or ILm. This is defined as the concentration at which 50% of the biomass, cell count, or photosynthetic activity is reduced as compared with a control over a 14 day period. For the sake of this assessment process, the Battelle definition applies. A material is categorized as phytotoxic to terrestrial plants if the "mean inhibitory limit" is 50 mg/l (Battelle, 1973).

For terrestrial plants, photosynthetic activity measurements are based on carbon dioxide exchange between the plant and its environment. The absolute CO_2 exchanges are calculated by the difference in CO_2 concentration in incoming and outgoing air. The air exchange rate is given as the amount of CO_2 per square area of leaf multiplied by the unit of time measured (Mudd and Kozlowski, 1975).

Guderian (1977) describes several additional methods of damage evaluation.

1. Changes in growth, yield, and plant quality.
2. Effects on seed quality and reproduction.
3. Degree of foliar injury.

The degree of foliar injury is measured by percent of necrotic area. Injury is scaled from very slight necrosis or chlorosis to extreme damage noted as very severe necrosis or chlorosis.

Due to the variability of methodologies and lack of standard testing methods, phytotoxicity data are reviewed for completeness, testing approach and damage as evaluated by the researcher.

C. AESTHETICS

CRITERION:

SCORE	Estimated threshold level in water (mg/l) producing tainting of fish and/or taste and Odor	Foaming properties and/or produces floating film and/or imparts major color change to water
1	0.001	Yes
0	0.001	No

RATIONALE:

Wastewater treatment plant discharges and industrial process waste effluent may contain organic compounds which can impart objectionable taste, odor, or color to fish and other aquatic organisms. Often, these offending materials can cause tainting at levels lower than those recognized as causing toxic effects (U.S. EPA, 1973).

The threshold levels indicated in the criterion represent the extreme end of the level of detectability. Compounds such as chlorophenols, which taint fish at very low concentrations or impart an undesirable taste to drinking water would be included (Lillard and Powers, 1975). Objectionable properties are difficult to quantify since these adverse conditions are subjectively determined. The score for aesthetics is therefore low to give greater weight to adverse biological effects.

3.8. Limitations of CMR Program

There are several shortcomings inherent in this system. First, there is little available information on the toxicity and environmental fate of many chemicals. Chemicals which lack sufficient information cannot be included on the CMR via the hazard assessment process. However, such compounds will be reviewed annually to obtain additional information as it is published.

A second problem involves the lack of adequate chemical composition information about commercial products. This presents a difficulty in identifying those products which may contain toxic substances. It is often difficult and time-consuming to convince industry to release such information due to its proprietary nature. This makes it extremely difficult for users of commercial products to determine if these products contain chemicals on the CMR. As a result, compliance with the program is lowered.

A third problem is the lack of inventory data on chemical manufacture and use. Michigan presently lacks legislation which would require a company to report a chemical prior to its manufacture or use. This results in the inclusion of chemicals which may not be used in Michigan, probably making the CMR more lengthy than necessary. The provisions of the Federal Toxic Substances Control Act could make this type of information available to states if confidentiality procedures did not block its disclosure.

PART II

Utilization of the Critical Materials Register

Chapter 4

Reporting Requirements

The Part 9 Rules of Act 245 as amended by Act 293 (Ex. 4-1), establish the reporting requirements of every person doing business in Michigan and discharging process or noncontact cooling wastewaters to waters of the state. Following the requirements, is a discussion of the development of the mailing list, the four wastewater/Critical Materials forms, the Critical Materials reporting review and compliance, and the reporting requirements of related legislation. Included in related legislation is the Toxic Substances Control Act, National Pollution Discharge Elimination System, the Resource Conservation and Recovery Act, and Michigan's Hazardous Waste Management Act. Future coordination of efforts between the various reporting systems is explained.

Chapter 4

Reporting Requirements

The reporting requirements established under the Part 9 Rules of Act 245, as amended (Ex. 4-1), require every person doing business in the State of Michigan and discharging process or noncontact cooling wastewater to waters of the State to complete a Wastewater/Critical Materials Report. The "waters of the State" include surface waters, sanitary sewer systems and groundwater (lagoons, surface of ground, septic systems). Municipal corporations and governmental units or agencies are exempt from reporting under this legislation.

Each person doing business in more than one location is required to file a separate report for each location. Reports must outline wastewater classification (process, noncontact), amount discharged and destination. The report must indicate all Critical Materials used in and incidental to operations of the business or manufacturing enterprise. The identification and amounts of Critical Materials that are discharged to waters of the State as waste products or by-products are also required along with other information on the waste substances generated from production processes or treatment of wastewater, disposed of in other manners than discharge to waters of the State.

Exhibit 4-1 Part 9 Rules of Act 245

DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES COMMISSION
GENERAL RULES

Filed with Secretary of State.
These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the water resources commission by sections 2, 6b and 13 of Act No. 245 of the Public Acts of 1929, as amended, being sections 323.2, 323.6b and 323.13 of the Michigan Compiled Laws.)

Part 9: Wastewater Reporting and Surveillance Fees

R 323.1231: Definitions A to C.

Rule 231. (1) "Act" means Act No. 245 of the Public Acts of 1929, as amended, being sections 323.1 to 323.13 of the Compiled Laws of 1948, and the act which these rules implement.

(2) "Advisory committee" means the group of environmental specialists created under section 6b of the act.

(3) "Commission" means the water resources commission of the department of natural resources.

(4) "Critical materials" means organic and inorganic substances, elements or compounds which are listed in a register compiled by the commission.

R 323.1232: Definitions H to W.

Rule 232. (1) "Hazardous materials" means oil and salt including but not limited to petroleum, gasoline, fuel oil, grease, sludge, oil refuse, oil mixed with waste, sodium chloride and calcium chloride, in solid or liquid form.

(2) "Legislative appropriations conversion factor" means a factor which is used to adjust surveillance fees upward or downward, so that the total of annual surveillance fees will equal the Legislative appropriation designated for industrial and commercial surveillance activities for a fiscal year.

(3) "Person" means an individual, partnership, association, corporation or any commercial or industrial entity doing business in the state which discharges wastewaters but does not include a municipal corporation, or a governmental unit or agency thereof.

(4) "Sewer system" means enclosed pipes and conduits which conduct wastewater to a wastewater treatment facility and are owned or operated by county, metropolitan district, city, village or other public body created by or pursuant to state law.

(5) "Wastewater" means both liquid waste discharges resulting from industrial or commercial processes, including cooling and condensing waters, and sanitary sewage from industrial or commercial facilities.

(6) "Waters of the state" means surface and underground waters including lakes, rivers, streams, open drainage conduits and all other watercourses and waters within the state and also the Great Lakes bordering thereon, except non-potable underground waters utilized incidental to gas and oil well operations that are subject to permit and surveillance under Act No. 61 of the Public Acts of 1939, as amended, being Sections 319.1 to 319.27 of the Michigan Compiled Laws.

R 323.1233: Register of critical materials.

Rule 233. A register of critical materials as initially compiled by the commission shall be published during the month of October 1971 by 1 of the methods prescribed by section 42 of Act No. 306 of the Public Acts of 1969, being section 24.242 of the Michigan Compiled Laws. Copies shall be made available to the public upon request. The register may be revised annually by the commission upon receipt of advice from the advisory committee. A revision shall be published in the same manner as the initial register and shall become effective only on the next annual anniversary date thereof.

R323.1234: Wastewater reports, contents and forms.

Rule 234. (1) A report shall be filed under section 6b and section 13 of the act by every person doing business within this state who either discharges wastewater to the waters of the state, or who discharges wastewater in addition to sanitary sewage to a sewer system. The report shall be on forms provided by the commission and shall set forth in detail:

(a) Name, location and nature of the enterprise or operation.

(b) Normal schedule of hours and days of operation of the enterprise.

(c) A fair estimate of the annual total number of gallons of wastewater which are to be discharged to the waters of the state or to any sewer system.

(d) Name of the watercourse or waters into which the wastewaters are discharged.

(e) A description of each point at which wastewaters enter the waters of the state, a sewer system or are disposed of by percolation underground.

(f) A list of those materials used in and incidental to operation of the business or manufacturing enterprise, which appear on the register of critical materials.

(g) A list of those critical materials listed on the register, including the annual amounts thereof, which are to be disposed of as waste products or by-products to the waters of the state, or any sewer system.

(h) Other information as needed for implementation of sections 6b and 13 of the act.

(2) Not later than October 1 of each year of the year for which reports are due, the commission shall mail a standardized reporting form and a register of critical materials to each person affected by section 6b and these rules.

R323.1235. Wastewater reports, filing and confidentiality.

Rule 235. (1) A wastewater report shall be filed annually with the commission not later than December 15 of each year. The reporting period is the calendar year in which the report is filed.

(2) An interim report shall be filed promptly when:

(a) The use of critical materials not previously reported is commenced during any year, or

(b) The amounts of critical materials used or discharged increase sufficiently to move the level of usage into a higher category on the annual critical materials report.

(3) A person doing business in more than 1 location shall file a separate report for each location.

(4) The information on the critical materials listed in an annual report as being used in and incidental to manufacturing operations shall be available to the public unless the release thereof would, in the opinion of the commission after petition by the person filing the report, fail to protect the confidentiality of proprietary manufacturing processes.

4.1 Development of the Mailing List

The mailing list of facilities required to report under Acts 245 and 293 was created in 1972 with implementation of the Wastewater/Critical Materials Reporting Program, following the passage of Act 293. The original list was obtained from the Michigan Department of Commerce's Corporation and Securities Bureau. Since that time various sources have been used to update and revise the list. Staff have used manufacturing directories and information on Michigan industries from other state departments including the Departments of Public Health and Labor. Other reporting systems functioning in the department are also checked periodically for mailing list comparisons. This is usually on a facility-by-facility basis due to different facility identification systems used by the various reporting systems. With passage of the pretreatment requirements under the NPDES system, use of pretreatment surveys submitted by municipal wastewater treatment plants identifying contributing industries have been helpful.

Prior to 1981, facilities were mailed Wastewater Report Forms and Instruction Booklets and were instructed to inform the department of any changes in their reporting status. The facility was also asked to provide the department with changes of address or new owner identification, if the industry re-located or property changed ownership.

In 1981, a change in the mailing procedures was made to economize on Instruction Booklet printing costs and the mailing costs. The mailing list was divided into those facilities which had filed current reports and those with no response. The companies with a current reporting status received an instruction booklet and others received a letter asking them to notify the department of their current status in regards to wastewater discharges. With the current mailing list of approximately 20,000 Michigan facilities, 14,000 letters and 4,000 booklets were distributed.

4.2 Wastewater/Critical Materials Forms

Wastewater Report Forms and Instruction Booklets are mailed to pertinent industries on October 1st of each year (complete booklet - Appendix B). In addition to the mailing label for individual facilities, the booklets are addressed to the attention of the person in charge of environmental activities.

The industry is asked to supply the department with information reflecting their operations for the current calendar year. This necessitates preparing the report prior to the end of the reporting period in order to meet the December 15th filing deadline. In the event of significant changes in wastewater disposal after the report has been filed, industries are directed to file an amended report outlining the changes. Interim reports are also required to be filed by an industry when:

1. The use of a Critical Material not previously reported is commenced during the year, or

2. Usage or discharge of a Critical Material increases sufficiently to move the level of usage or discharge into a higher category on the Critical Materials report, or

3. Use or discharge of a Critical Material is discovered after Critical Materials Report is filed.

In 1980, the Wastewater Reports and Instruction Booklet underwent a significant change. Prior to 1980 industries were required to file a new set of completed forms each year describing their activities. In 1980, the information supplied to the department from the previous year's report was pre-printed for each individual facility on computerized versions of the Wastewater and Critical Materials Report Forms. The industries were then instructed to review and correct the data that was printed on the forms. This new format assisted both the department and the reporting industries in the following ways.

1. It reduced the cost of data entry of information that remained consistent from year-to-year (i.e., name, address, outfall descriptions, etc.).

2. It informed the industry of past year's information kept on file in the Department.

NOTE: This proved particularly beneficial to industries that had undergone changes in personnel in charge of wastewater report activities.

3. The number of inaccurate or incomplete forms was reduced.

4.2.1 General Information - (Form I)

Form I of the Wastewater/Critical Materials Report is used to collect general information on the facility (Ex. 4-2). Companies are asked to supply the department with their name and facility location. Each company is responsible for filing a separate report for each facility location that has a process or cooling water discharge.

Exhibit 4-2 Form I General Information

FORM I
GENERAL INFORMATION

1981
10

SEE INSTRUCTIONS ON PAGE 3
DO NOT DUPLICATE 1980 COMPUTER
PRINTED INFORMATION IF CORRECT
FOR 1981. ENTER ONLY
CORRECTIONS OR ADDITIONS.

A. FACILITY NUMBER → ☐

DNR USE ONLY – ACTION				
	OK	Delete	New	Change
Initial	☐	1. ☐	2. ☐	3. ☐

A SEPARATE REPORT IS REQUIRED FOR EACH LOCATION AT WHICH YOUR COMPANY DOES BUSINESS.
For other locations, please copy additional forms from page 5 of instruction booklet.

1. Do you or did you own or operate a business (commercial or industrial) in the state of Michigan during any part of 1981?
   - ☐ No. Skip questions 3 thru 12, sign the report, and see page 19 for mailing instructions.
   - ☐ Yes. In the space below briefly describe your business then continue with question 2.

---

2. Mailing Address:

If any part of the mailing address is incorrect please update incorrect line(s) only below.
If you have sold the business to the person listed below please check here ☐

If the plant location is different than the location of the facility to which this form is mailed indicate the address of the plant location below.

Plant Name ______________________

Address ______________________

City & State ______________________

Name of Company ______________________

Plant Location/Attn. ______________________

Street Address or P.O. Box ______________________

City ______________________ State ____ Zip ________

1980 MONITORING YEAR	1981 MONITORING YEAR
The printed information is currently on our files. Use the data as reference in filling out the form. Enter new or changed data at right.	Report data for the 1981 calendar year only if different from 1980 data.
3. EPA Identification Number (if available)	____ ____________
4. Federal Employer's Withholding Tax Acc't. Number	___ – _________
5. Standard Industrial Classification Code (see page 4)	_____
6. County of plant location (see page 2)	__

COMPLETE REVERSE SIDE OF FORM

—— DNR USE ONLY ——	
Dist.: F.A.: R.: PIP: S. Sewer: Yr.:	☐ ☐ ☐ ☐ ☐ ☐

R 4838-4

Exhibit 4-2 (con't.)

7. Did the operation of your business result in the discharge of ANY wastewater (including cooling water and sanitary sewage from toilets, washrooms, etc.)?
   A. ☐ Yes. Continue with question 8.

   B. ☐ No. Go to question 13, sign the report and see page 19 for mailing instructions.

---

8. Is ALL of your wastewater sanitary sewage? (Note: Sanitary sewage includes wastewater from toilets, washrooms, drinking fountains, kitchens, and other sanitary facilities which may produce HUMAN WASTE. Sanitary waste does NOT include cooling water, condenser water, process wastewater, laundry or car wash water.

   A. ☐ Yes. Continue with question 9.

   B. ☐ No. Skip question 9. Continue with question 10. You must also complete and attach Form II.

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9. If ALL of your wastewater is sanitary sewage does it go to a septic tank or a municipal sanitary sewer?
   ☐ Yes. Septic Tank.
   ☐ Yes. Sanitary sewer. (Note: lagoons are not included in either of these categories)
   If you marked either of the above go to question 13, sign the report, and see page 19 for mailing instructions.
   ☐ No. Continue with question 10. You must also complete and attach Form II.

---

10. Do you use, manufacture, or discharge any of the Critical Materials listed on pages 12 or 13?
    ☐ Yes. Continue with question 11. You must also complete and attach Form III.
    ☐ No. Continue with question 11.

---

11. Does the operation of your production process or wastewater treatment facility (other than septic tanks) result in a residual, residue or sludge type waste material that contains any Critical Materials listed on page 12 or 13?
    ☐ Yes. Continue with question 12. You must also complete and attach Forms III(s) and Form IV(s).
    ☐ No. Continue with question 12.

---

12. Schedule of operation

_______ hours/day _______ days/week _______ weeks/year
_______ hours/day _______ days/week _______ weeks/year
_______ hours/day _______ days/week _______ weeks/year

13. Complete the following before mailing form(s)

Phone Number	Number of Employees	
Name and Title of Person Completing Report (please print)	Signature	Date
Name and Title of Person Certifying Report (please print)	Signature	Date

The company's "facility number" must be verified (if computer preprinted) or provided on their forms. This is a six digit number unique to the Wastewater/Critical Materials system. If the company is new or does not have a number, one is assigned by the department when the form is submitted. All forms submitted in the Report by the company must have their facility number accompanying them.

The company is also instructed to provide the department with their EPA Identification Number. This number will be used in the future to provide a common link among federal and state programs (i.e., hazardous waste, NPDES) which involve industry reporting.

The department also requests the Michigan Federal Employer's Withholding Tax Account Number for use in the Surveillance Fee Program, which also utilizes Wastewater Report Form Information.

In addition to questions regarding the company's individual operations involving wastewater discharge, and operations schedule, the company is asked to classify itself according to a general manufacturing classification. The "Standard Industrial Classification (SIC) Code" system is used for this purpose. Each booklet comes with an edited list of SIC codes. Companies choose the code which best describes their facility.

The company must also certify the reports and identify the persons in charge of completing and certifying the Report Forms.

4.2.2 Wastewater Outfall Report (Form II)

The Wastewater Outfall Report (Ex. 4-3) must be filed for each point of discharge where wastewater enters waters of the State (including groundwater and sanitary sewer systems).

The reporting industries are instructed to provide information on the following topics:

> Outfall Identification: Identify the outfall by providing the outfall number as it is normally referred to. If there is no special designations for outfalls, number them 001, 002, etc.
>
> MOR Report Number: If monthly operating reports (MOR's) are submitted, enter the appropriate outfall number in the space so marked (required for most NPDES permits).
>
> Outfall Description: Brief description of the nature and source of the wastewater from this outfall, a description of the outfall and the geographical location of the outfall.
>
> Discharge Type: The type of discharge, the name of the receiving water, or sanitary sewer receiving the discharge. Lagoons with an outlet to surface waters must be reported as surface water discharges. Discharges to combined storm-sanitary sewer systems may be reported as municipal sanitary discharges.
>
> Volume of Discharge: Flow figures (average, maximum and total) in units of million gallons per day (MGD). The average daily flow figure should be based on the number of days during the year on which the outfall is discharged.
>
> Type of Wastewater: The type of wastewater (i.e., process, noncontact cooling or sanitary sewage) discharged by the outfall.

During review of the information submitted on the Form II, the department assigns various in-house pieces of information corresponding to the company's discharge situation. If the outfall discharges to a municipal sanitary sewer, the identification code of the municipality is assigned. This is used in various computer data sort and select options (explained further in Chapter 5). If the outfall discharges to surface waters, the drought flow and designated use of the receiving waters is coded. These are used in calculating the industry's Surveillance Fee and in various computer programs (see Chapter 5). MDNR uses the

Exhibit 4-3 Form II Wastewater Outfall Report

FORM II
WASTEWATER OUTFALL REPORT

1981
20

SEE INSTRUCTIONS ON PAGE 7
DO NOT DUPLICATE 1980 COMPUTER
PRINTED INFORMATION IF CORRECT
FOR 1981. ENTER ONLY
CORRECTIONS OR ADDITIONS.

A. FACILITY NUMBER ⟶ ☐

DNR USE ONLY – ACTION	OK	Delete	New	Change
Initial	☐	1.☐	2.☐	3.☐

B. OUTFALL NUMBER AS YOU REFER TO IT ⟶ ☐

C. MONTHLY OPERATING REPORT NUMBER ⟶ ☐

1980 MONITORING YEAR	1981 MONITORING YEAR
The printed information is currently on our files. Use the data as reference in filling out the form. Enter new or changed data at right.	Report data for the 1981 calendar year. If this outfall was never used during 1981 and is permanently discontinued, check this box ⟶ ☐
D. OUTFALL LOCATION: Township, Range, and Section Number (if available); *give word description of wastewater, outfall and location at right*	T-☐☐☐☐ R-☐☐☐☐ S-☐☐☐
E. DISCHARGE TYPE: 1. Surface Waters (river, stream, drain, storm sewer, lake, etc.; *give name of receiving water at right)* 2. Lagoon or Seepage Pond With No Outlets 3. Spray Irrigation 4. Septic Tank – Tile Field 5. Deep Well Disposal 6. Surface of Ground 7. Other (describe at right) 8. Municipal Sanitary Sewer (give name of municipality at right)	☐ ____________________
F. VOLUME OF DISCHARGE Average Daily Flow (Million Gallons per Day) ________	☐☐☐☐ • ☐☐☐☐☐ Measured ☐ Estimated ☐
Maximum Daily Flow (Million Gallons per Day) ________	☐☐☐☐ • ☐☐☐☐☐
Total Annual Flow (Million Gallons per Year) ________	☐☐☐☐☐☐☐ • ☐☐☐☐☐
G. TYPE OF WASTEWATER (each outfall must add to 100%) % Process ________	☐☐☐ % (Do not enter decimal or fraction)
% Noncontact Cooling ________	☐☐☐ %
% Sanitary Sewage ________	☐☐☐ %

FOR ADDITIONAL OUTFALLS, COPY ADDITIONAL FORMS FROM PAGE 9 OF INSTRUCTION BOOKLET

— DNR USE ONLY —

D.F.: D.U.: C.M.: Diff.: I.S.A.: ☐☐☐☐☐☐ ☐☐☐ ☐ ☐☐☐ ☐

FORM II – PARAMETER REPORT LEVEL 40 ☐ OK 1.☐ 2.☐ 3.☐ ☐

☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐

☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐

☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐

R 4886-5

following classifications for drought flow and designated use.

Drought Flow: Ten year-seven day low flow average

Designated Use: Domestic Water Supply or
Recreation-Total Body Contact or
Coldwater Fish Species or
Warm Water Fish Species

4.2.3 Critical Materials Report (Form III)

Companies must complete one Form III (Ex. 4-4) for every Critical Material which is used, manufactured, discharged and/or contained in a residual at their facility. A list of the Critical/Materials is provided with every instruction booklet. The following guidelines for reporting these materials are also outlined in the Instruction Booklet.

> Any Critical Materials being discharged must be reported regardless of their origin, unless these critical materials originate in intake water.
>
> Except as noted below, all Critical Materials used or manufactured must be reported even if the Critical Materials are recovered or do not come in contact with water.
>
> > Inorganic Critical Materials present as incidental trace contaminants in other substances being used need not be reported. Incidental trace contaminants are materials not purposefully added and present at concentrations less than 1 percent by weight.
> >
> > Organic Critical Materials present as incidental trace contaminants in another host substance being used, need be reported only by manufacturer of the host substance. Incidental trace contaminants are materials not purposefully added and present at concentrations less than 1 percent by weight.
> >
> > Critical Materials classified as Pesticides, and Drugs, Food Additives, and Naturally Occurring Chemicals need be reported only by their manufacturers and formulators.
> >
> > Critical Materials used strictly in analytical laboratory quantities (less than 1 pound) need not be reported.
> >
> > Critical Materials incorporated structurally or mechanically in your plant buildings (e.g., copper pipe, chromium plated hardware, treated wood) need not be reported.

Exhibit 4-4 Form III Critical Materials Report

FORM III
CRITICAL MATERIALS REPORT

1981
30

SEE INSTRUCTIONS ON PAGE 10
DO NOT DUPLICATE 1980 COMPUTER
PRINTED INFORMATION IF CORRECT
FOR 1981. ENTER ONLY
CORRECTIONS OR ADDITIONS.

A. FACILITY NUMBER → ☐

DNR USE ONLY - ACTION				
	OK	Delete	New	Change
Initial	☐	1 ☐	2 ☐	3 ☐

B. CRITICAL MATERIAL NAME: ____________________

C. CRITICAL MATERIAL PARAMETER NUMBER → ☐
(Page 12-13)

D. If the material in Item B is *purchased for use* describe the use by marking one or more of the following.

☐ formulated or resold without change
☐ used in production process
☐ used in non-production activity (pilot plant, maintenance etc.)
☐ non-consumptive use (i.e. PCB's contained in transformers, capacitors, etc.)
☐ other (describe) ____________________

If you *manufacture* the material in Item B mark one or more of the following.

☐ manufactured for sale
☐ produced for use as an intermediate or ingredient in another on-site production process
☐ produced as contaminant or by-product
☐ other (describe) ____________________

TABLE A1

0 = 0 lbs.
1 = less than 1 lb.
2 = 1 - 10 lbs.
3 = 11 - 100 lbs.
4 = 101 - 500 lbs.
5 = 501 - 1000 lbs.
6 = 1001 - 10,000 lbs.
7 = over 10,000 lbs.

1980 MONITORING YEAR The printed information is currently on our files. Use the data as reference in filling out the form. Enter new or changed data at right.	1981 MONITORING YEAR Report data for the 1981 calendar year. If this critical material was never used or discharged during 1981 and is permanently discontinued, check this box → ☐
E. Amount of Item B Used or Manufactured Per Year (See Table A1 for code number) If Over 10,000 Lbs/Yr, Indicate Amount to Nearest 10,000 Lbs.	☐ ☐☐☐☐☐☐☐☐☐
F. Amount of Item B that was or may have been Discharged In Wastewater Per Year (See Table A1 for code number) If Over 10,000 Lbs/Yr, Indicate Amount to Nearest 10,000 Lbs.	☐ Incidental Trace Contaminants ☐ ☐☐☐☐☐☐☐☐☐
Outfall Numbers Reported on Form II Which Discharge This Critical Material (List in decreasing order according to amount of Critical Material discharged)	☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐
G. Amount of Item B that was or may have been Contained In Residuals Per Year (See Table A1 for code number) If Over 10,000 Lbs/Yr, Indicate Amount to Nearest 10,000 Lbs. (If > 0, Submit Form IV)	☐ ☐☐☐☐☐☐☐☐☐
H. Check Here If You Want The Information In Item D and E To Remain Confidential As Provided By Section 6b of Act 293 And Rule 235(4).	☐

REVIEW 1981 CRITICAL MATERIALS REGISTER (PAGE 12) TO VERIFY THIS AND ANY ADDITIONAL CRITICAL MATERIALS.
FOR REPORTING ADDITIONAL CRITICAL MATERIALS, PLEASE COPY ADDITIONAL FORMS FROM PAGE 15 OF INSTRUCTION BOOKLET.

***AN ASTERISK INDICATES THAT THIS ITEM IS CONFIDENTIAL; PLEASE RE-ENTER THIS INFORMATION.**

R 4888-6

> Critical Materials which are a fixed part of pre-manufactured assemblies or hardware obtained from another manufacturer and incorporated without change into your product need not be reported.

The inclusion of any chemical on the Critical Materials Register does not mean that these chemicals cannot or should not be used. Companies are informed that the Critical Materials Register is a list of chemicals that can be harmful if misused or disposed of improperly and that if a certain chemical does not appear on the Critical Materials Register, it does not mean that the chemical is not dangerous. Chemicals not on the Critical Materials Register may be harmful but may not be included on the list because adequate studies have not yet been conducted concerning their harmful effects.

Companies are requested to indicate the type of use or manufacture of Critical Materials. They also must indicate the amount of each material in pounds per year used, discharged, or disposed of in a residual. If the information supplied on the amounts of a Critical Material used or manufactured would divulge the confidentiality of a proprietary manufacturing process, the company can request confidentiality for that information. This process was established under Section 6b of Act 293 and Rule 235(4). The amounts of a material that are discharged to the waters of the State cannot be held confidential.

If the company indicates that a material is being discharged in an amount greater than zero, the outfall(s) which discharge(s) the material must be listed.

At this point in the Michigan reporting program, companies have not been required to indicate the percentage or concentration of the material present in each outfall. This would be very helpful, particularly in situations where two or more outfalls are listed that have different discharge destinations (i.e., surface water, municipal sewer system). Michigan's experience has found that the value of the information on amounts of a material discharged would be increased, in multiple outfall situations,if percentage or concentration were provided.

4.2.4 Residuals and Residues Disposal and Storage Report (Form IV)

Companies are also requested to submit to the department reports for residuals and residues that contain Critical Materials (Ex. 4-5) which have been generated at each facility location during the year.

Residuals and residues are the final waste substances remaining for disposal after wastewater treatment or production process activity involving any Critical Material(s). Residuals and residues receive no further processing or treatment by the company. They must either be disposed of or stored for eventual disposal. They are not discharged in wastewater.

Typical residuals include but are not limted to:

- liquid or semi-liquid sludges
- dry or partially dry filter cake after liquid removal
- waste oils (lubricating and cooling)
- waste solvents not reprocessed on site
- still residues
- chemical reaction vessel residues
- wet or dry dust involving any Critical Material

Companies are asked to list the Critical Materials (by parameter number) contained in the residual or residue and describe its source, physical state and characteristics. The total annual weight or volume of the residual must also be indicated.

The company must outline disposal procedures and storage and provide the department with the name and location of disposal site and/or commercial

Exhibit 4-5 Residuals and Residues Disposal and Storage Report

FORM IV
RESIDUALS AND RESIDUES DISPOSAL AND STORAGE REPORT

1981
50

SEE INSTRUCTIONS ON PAGE 16
DO NOT DUPLICATE 1980 COMPUTER
PRINTED INFORMATION IF CORRECT
FOR 1981. ENTER ONLY
CORRECTIONS OR ADDITIONS.

COMPLETION OF FORM IV IS REQUIRED
ONLY WHEN RESIDUALS AND RESIDUES
CONTAIN CRITICAL MATERIALS

A. FACILITY NUMBER → ☐

DNR USE ONLY - ACTION				
	OK	Delete	New	Change
Initial	☐	1. ☐	2. ☐	3. ☐

B. Production Process Residual (P) or Wastewater Treatment Residual (W) or Combination (C) ☐

C. PHYSICAL STATE
1=liquid 2=heavy sludge 3=wet solid 4=dry solid ☐

1980 MONITORING YEAR	1981 MONITORING YEAR
The printed information is currently on our files. Use the data a reference in filling out the form. Enter new or changed data at right.	Report data for the 1981 calendar year. If this residual contained no Critical Materials during 1981, check this box → ☐
D. Parameter number(s) of critical material present in residual (Form IV must be accompanied by Form III for each Critical Material listed in the residual)	
E. The Liquid Portion is Primarily 1) water 2) oil 3) chemical solvent	☐ (enter no more than one choice per form)
F. The Residue Results From 1) Chemical Production 2) Food Processing 3) Machining 4) Dust Collection 5) Paint Booths 6) Water Treatment 7) Process Water 8) Sanitary Sewage 9) Other (describe at right)	☐ ☐ ☐ (enter no more than three choices per form) ________________
G. Estimated Total Residual Annual Volume or Weight	☐ Gallons ☐ Pounds ☐ Cu. Yd.
H. Storage Before Disposal or Removal 1) Metal Drums 2) Fiber Drums 3) Above Ground Tank 4) Underground Tank 5) Stock piled on Ground 6) Holding Pond/Lagoon 7) Other (specify at right)	☐ ☐ ☐ (enter no more than three choices per form) ________________
I. If You Dispose of the Residue Yourself, Type of Disposal Site 1) Public Landfill 2) Private Landfill 3) Own Land 4) Shipped Out of State 5) Incinerated 6) Other (specify at right)	☐ ☐ ☐ (enter no more than three choices per form) ________________

COMPLETE REVERSE SIDE OF FORM R 4888-7

Exhibit 4-5 (con't.)

J. If a public or private landfill(s) is used give the name(s) and location(s). Attach separate list if necessary.

____

____

____

____

K. If you have the material removed by commercial waste or refuse hauler(s) give the name(s) and address(es). Attach separate list if necessary.

____

____

____

____

For additional residuals, please copy additional forms from page 17 of instruction booklet

waste or refuse hauler(s) involved in transportation for disposal.

4.3 Critical Materials Reporting Review and Compliance

Prior to the award of the Toxic Substances Control Act Cooperative Agreement, minimal effort had been exerted by the department in follow-up and compliance of Critical Materials reporting. The area of follow-up and compliance was a top priority for the program, subsequent to the agreement. It was felt that an accurate and complete data base was essential to proper functioning of future programs being developed under the agreement.

The 1978 reports submitted by Michigan industries were the first to undergo extensive review and follow-up by staff since companies had been required to report Critical Materials. Based on input from this experience, the report forms for upcoming years were altered to increase compliance and reduce the number of inaccurate or incomplete forms. Compliance and form review procedures were also restructured to address the needs of problem areas.

In 1979, approximately 1,000 compliance-related contacts were made to reporting industries. In 1980, following the report format change to computerized forms with the previous year's data displayed, there was a significant reduction in compliance needs. Approximately 200 contacts were made to correct errors and/or amend reports with incomplete information in 1980.

4.3.1 Procedures for Manual Review of Forms

Manual review of industrial Wastewater/Critical Materials Report forms by staff is useful for a variety of purposes. The major purpose is to immediately locate errors or inaccuracies on the forms and correct them before the data is entered into the system. This is often conducted via phone with the reporting industry. These contacts also help the industries to understand the rationale for reporting and how their reported information is used in the department. Experience from industrial contacts showed that many of the errors on the reports were based on misunderstanding or lack of knowledge in areas relating to chemical substances. The follow-up contacts were often an educational experience as well as a compliance activity.

Another purpose of the follow-up was the ability to detect common mistakes or misunderstandings after reviewing a large number of forms. Upon detection of a common problem of this sort, the forms and/or instruction booklet were clarified for the upcoming year.

4.3.2 Computerized Quality Control

After the forms are reviewed manually, they are submitted for data entry. Once the information from the forms has been entered into the data bank, computerized quality control can take place. This is done in the form of an "error detection" program run on collected data (see Chapter 5.1). This program flags facility records with missing information or information that is incompatible with other collected data. This type of compliance follow-up also has many purposes. First, it backs up the manual review process and detects "human" errors or oversights that may have taken place during the manual review process. It also allows all the data entered to be checked, so that data entry (key punching) errors and errors on forms that missed manual review will be detected. The third purpose, like that of manual review, is the ability to check a large number of forms and detect common errors or misunderstandings.

4.3.3 Compliance Activities

Following manual and computer review, compliance procedures are started to check errors or missing information (Ex. 4-6).

The first step following review by staff is via phone contact to request amendments to the original report. Records are kept of these phone contact amendments. If a satisfactory response is received by staff, the amended forms are sent on for further processing. The industry is also advised by letter of amendments made to the report. If no response, or an unsatisfactory response is received, a staff letter is sent requesting further information. If the first letter is unsuccessful in gaining a response, a registered administrative letter is sent, specifying a time limit in which a response must be received by the department.

If this procedure also proves unsuccessful, the situation is referred to the department's Compliance and Enforcement sections.

Michigan's experience in performing follow-up and compliance activities of this reporting system show that most situations involving erroneous information are corrected with phone contacts or staff and administrative letters. There have only been a few situations that have been referred to the compliance and enforcement sections for further action.

Other projects that have involved compliance and follow-up have dealt with various industrial groups. Surveys were conducted of various types of manufacturing and service industries to determine the numbers of industries who file reports with and without Critical Material usage within specific industrial classifications (Table 4.1).

Exhibit 4-6 Follow-Up and Compliance Procedures

DNR - EPA TSCA COOPERATIVE AGREEMENT
FOLLOW - UP AND COMPLIANCE

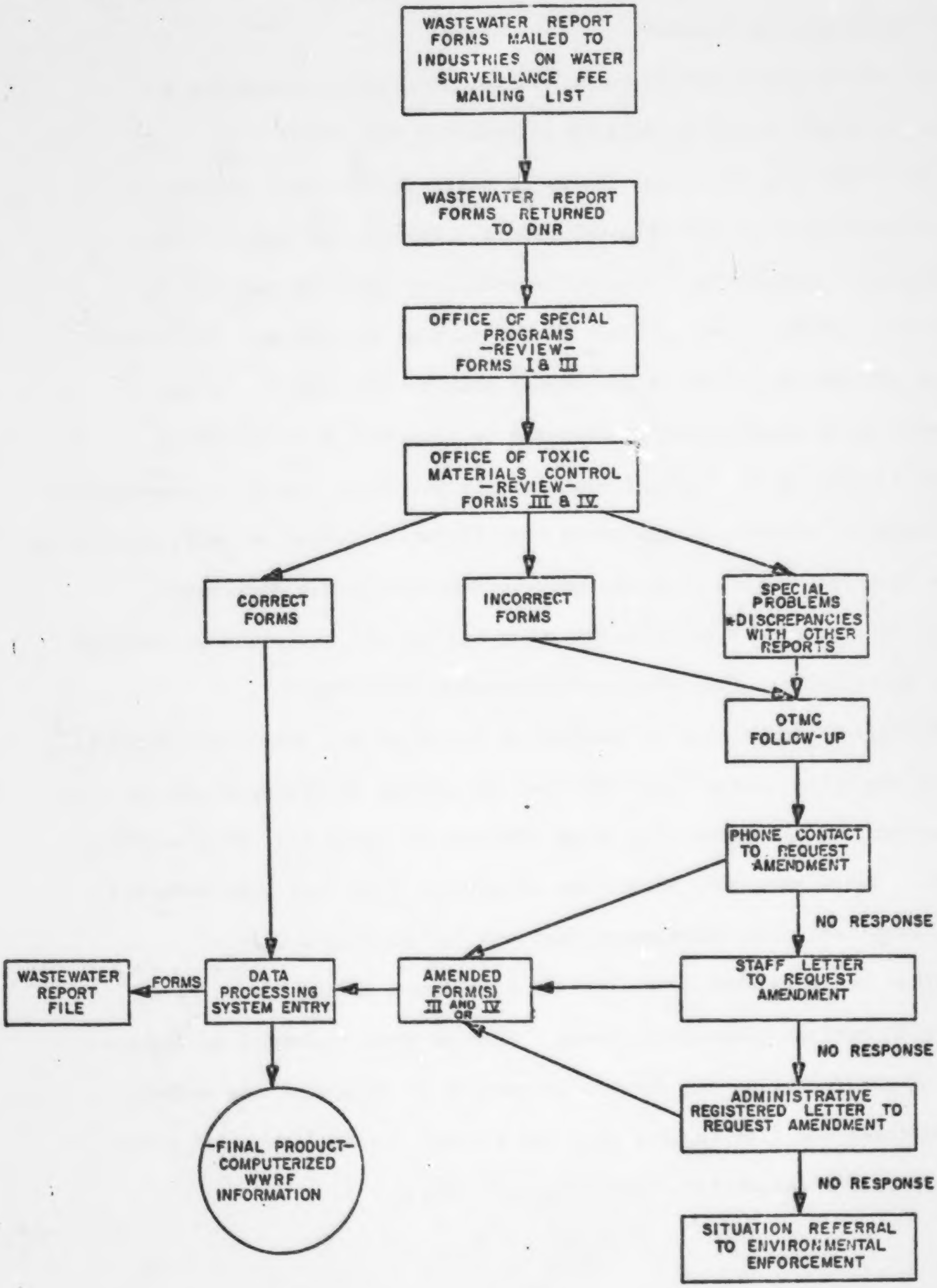

WASTEWATER REPORT FORMS MAILED TO INDUSTRIES ON WATER SURVEILLANCE FEE MAILING LIST
WASTEWATER REPORT FORMS RETURNED TO DNR
OFFICE OF SPECIAL PROGRAMS -REVIEW- FORMS I & III
OFFICE OF TOXIC MATERIALS CONTROL -REVIEW- FORMS III & IV
CORRECT FORMS
INCORRECT FORMS
SPECIAL PROBLEMS *DISCREPANCIES WITH OTHER REPORTS
OTMC FOLLOW-UP
PHONE CONTACT TO REQUEST AMENDMENT
NO RESPONSE
STAFF LETTER TO REQUEST AMENDMENT
NO RESPONSE
ADMINISTRATIVE REGISTERED LETTER TO REQUEST AMENDMENT
NO RESPONSE
SITUATION REFERRAL TO ENVIRONMENTAL ENFORCEMENT
AMENDED FORM(S) III AND OR IV
DATA PROCESSING SYSTEM ENTRY
FORMS
WASTEWATER REPORT FILE
-FINAL PRODUCT- COMPUTERIZED WWRF INFORMATION

Table 4.1 Critical Materials Reporting - 1980

CRITICAL MATERIALS REPORTING -1980

SIC CODE	TITLE	Number on Mailing List	Respond Without CM (% of total)	Respond With CM (% of total)	Non-Respond (% of total)
2400	Wood & Wood Products	47	2 (4)	0	45 (96)
2490	Misc. Wood Products	157	12 (8)	0	145 (92)
2491	Wood Preserving	6	0	2 (33)	4 (67)
2600-2699	Paper and Allied Products	238	36 (15)	48 (20)	154 (65)
2600-2631*		61	9 (15)	28 (46)	24 (39)
2700-2799	Printing and Publishing	1394	109 (8)	100 (7)	1185 (85)
2800-2899*	Chemicals and Allied Products	602	90 (15)	137 (23)	375 (62)
2820*	Plastics Material and Synthetics	74	17 (23)	11 (15)	46 (62)
2850*	Paints, Allied Products	70	4 (6)	19 (27)	47 (67)
2860*	Industrial Organic Chemicals	16	3 (19)	9 (56)	4 (25)
2890*	Miscellaneous Chemical Products	91	20 (22)	34 (37)	37 (41)
2911*	Petroleum Refining	14	1 (7)	7 (50)	6 (43)
3000-3099	Rubber and Misc. Plastic	516	136 (26)	41 (8)	339 (66)
3100-3111	Leather and Leather Products	29	1 (3)	4 (14)	24 (83)
3300	Primary Metal Industries	64	6 (9)	4 (6)	54 (85)
3315	Steel Wire and Related Products	16	4 (25)	2 (13)	10 (62)
3316	Cold Finish of Steel Shapes	53	8 (15)	2 (4)	43 (81)

Table 4.1 (con't.)

3317	Steel Pipe and Tubes	21	2 (10)	4 (19)	15 (71)
3331	Primary Copper	4	0	0	4 (100)
3333	Primary Zinc	3	0	2 (67)	1 (33)
3360	Die Casting	91	7 (8)	32 (35)	52 (57)
3362	Brass, Bronze and Copper Foundries	22	2 (9)	6 (27)	14 (64)
3390	Misc. Primary Metal Products	66	11 (17)	9 (14)	46 (69)
3398	Metal Heat Treating	102	35 (34)	13 (13)	54 (53)
3400	Fabricated Metal Products	225	33 (15)	15 (7)	177 (78)
3450	Screw Machine Prop., Bolts	368	40 (11)	10 (3)	318 (86)
3460	Metal Forgings and Stamping	123	14 (11)	9 (7)	100 (82)
3471*	Plating and Polishing	324	22 (7)	150 (46)	152 (47)
3479	Metal Coating and Allied	116	23 (20)	42 (36)	51 (44)
3490	Misc. Fabricated Metal Products	788	137 (17)	61 (8)	590 (75)
3700*	Transportation Equipment	16	3 (19)	1 (6)	12 (75)
3711	Motor Vehicles and Car Bodies	34	2 (6)	13 (38)	19 (56)
3714	Motor Vehicle Parts and Accessories	281	42 (15)	91 (32)	48 (53)
3715	Truck Trailors	8	1 (12)	0	7 (88)
3720	Aircraft and Parts	40	5 (13)	6 (15)	29 (72)
3800- 3899	Instruments and Related	233	25 (11)	22 (9)	186 (80)

Table 4.1 (con't.)

3860	Photographic Equipment	22	3 (14)	10 (45)	9 (41)
4200	Trucking and Warehousing	31	10 (32)	3 (10)	18 (58)
4911*	Electric Services	67	29 (43)	26 (39)	12 (18)
7391	Laboratories Test, Research	69	12 (17)	23 (33)	34 (49)
7399	Water Softener Service	67	17 (25)	10 (15)	40 (60)

* Surveys not conducted on these specific groups in 1979.

JK:vvb
10/5/81

An example of this involved the dry cleaning facilities in the state, and their use of tetrachloroethylene (perchloroethylene). Increased emphasis was put on updating the program's mailing list of current dry cleaning establishments. A letter was also sent to all the facilities on the mailing list in the SIC code for "Laundry, Cleaning and Garment Services", explaining the reporting requirements of Act 245 in regards to Critical Materials, including tetrachloroethylene, the commonly used drycleaning solvent.

Again, this proved to be an educational process, due to the confusion by some drycleaning operators of the common synonomous name of perchloroethylene for tetrachloroethylene.

A more detailed explanation of activities of this sort will be given in Chapter 7, discussing use of Critical Materials information.

4.4 Reporting Requirements of Related Legislation

There are various other pieces of State and Federal legislation which also require companies to submit reports on aspects of chemical use, production, discharge and disposal. These various legislative reporting requirements require identical information in some instances, dependent on the particular situation, the use of the information and the end goal of the legislation. The Wastewater/Critical Materials Reports contain information that may be required under the Federal Toxic Substances Control Act, the National Pollution Discharge Elimination System and supporting legislation, the Federal Resource Conservation and Recovery Act, and Michigan Hazardous Waste Act (Table 4.2). These

Table 4.2 Comparison of Reporting Requirements

Information Required	Michigan Act 245: Water Resources Commission Act Wastewater/Critical Materials Reports	Michigan Act 245 and U.S. Clean Water Act: NPDES Permit Program	Michigan Act 64: Hazardous Waste Management Act	U.S. Resource Conservation and Recovery Act	U.S. Toxic Substances Control Act
Facility Information					
Name	X	X	X	X	X
Mailing Address	X	X	X	X	X
County Code	X	X			
EPA I.D. #	X	X	X	X	
SIC Code	X	X			
Facility Location	X	X	X	X	
Chemicals Manufactured					
Identification	X	X			X
Amount	X	X			X
Chemicals Used					
Identification	X	X			
Amount	X	X			
Chemicals Discharged					
Identification	X	X			
Amount	X	X			
Site of Discharge	X	X			
Chemicals Disposed					
Identification	X	X	X	X	
Amount in Waste	X	X	X		
Type of Waste	X	X	X	X	X
Type of Waste Storage prior to disposal	X	X			
Physical state of waste	X	X	X		
Quantity of waste	X	X	X	X	
Method of disposal	X	X	X	X	X
Name & Address of disposal Site	X	X	X	X	
Commercial waste or refuse hauler					
Name	X	X	X	X	
Address	X	X	X		

acts and a general description of their reporting requirements are outlined below.

4.4.1 Toxic Substances Control Act

This act dictates among other things, that data be developed on the effects of chemical substances and mixtures, on human health and the environment and that the manufacturers, and processors of these substances and mixtures be responsible for development of this data.

Section 8 of the act outlines reporting requirements and retention of information. Under rules promulgated by the Environmental Protection Agency Administrator, each person (other than a small manufacturer or processor) who manufactures or processes or proposes to process a chemical substance (unless specified by the Act) must maintain records and submit reports as required by the Administrator. Persons manufacturing, processing or proposing to process chemical mixtures or chemicals in small quantities for research purposes may also be required to follow procedures for reporting outlined by the Act if deemed necessary by the Administrator.

Information required on the chemical substances includes chemical identification, amounts manufactured or produced, descriptions of by-products resulting from use or disposal, environmental and health effects data, and estimates of individuals exposed and durations and types of exposure.

4.4.2 The National Pollution Discharge Elimination System and Supporting Legislation

The Federal Water Pollution Control Act Amendments of 1972 requires that all point source surface water dischargers obtain a National Pollution Discharge Elimination System (NPDES) permit. This permit is obtained from a state or federal environmental regulatory agency, dependent on locale of the point source and jurisdiction of the agency. The application (Form 2c Consolidated Permit Application) for a permit must be completed by all persons applying for the permit to discharge wastewater. This includes existing manufacturing, commercial, mining and silvaculture operations.

With the following information supplied on an application, a permit is developed establishing effluent limitations for materials discharged by the point source.

1. Outfall location, including name of receiving water and geographical description of outfall location.
2. Outfall description, including wastewater flow diagram, outfall flow frequency rate, volume and duration of flow.
3. Existing treatment technology, and maximum effluent production quantity.
4. Improvements on outfall, since submission of last application.
5. Intake and effluent characteristics; this involves listing pollutants, their sources, chemical identification (Chemical Abstract service number) and concentrations detected.
6. The potential for discharge of pollutants, including expectations of chemical use and manufacture in the next five years, and/or predicted changes in operations that will change composition of effluent.
7. Biological toxicity testing of effluent, if available.
8. Effluent analysis information (contract laboratory or consulting firm).

Point source dischargers are required in Michigan to supplement their Form 2c permit applications with information on their facility, the type of operation involved, the wastewater discharged including use of water treatment additives, sludge disposal and Critical Materials associated with the operations of the company.

A great deal of the information required from a company on its NPDES application and in the Wastewater/Critical Materials Report is the same. The difference between the two reporting systems is the frequency of report submission, and persons in the state who are required to submit reports.

The applications for NPDES permits are required for new sources considering a discharge to surface waters and for existing sources prior to expiration of their current NPDES permit (one to five years). The Wastewater/Critical Materials Report must be filed annually updating or confirming information for the current reporting year on the Critical Materials used and discharged, the operations of the facility, locations, and characteristics of the point source (outfall) discharges.

4.4.3 The Resource Conservation and Recovery Act and Michigan's Hazardous Waste Act

These pieces of legislation regulate the transport and disposal of hazardous waste. Presently industries in Michigan are required to operate under both programs created by these Acts, however, upon Federal approval of the state program, Act 64 will supersede RCRA.

Industries which have waste that is classified as hazardous are required to notify EPA of their status (generator, transporter, disposal site) and receive an EPA identification number. They then use this number in all future transactions concerning transport and disposal of their waste. The company is also required, under Michigan's Act 64, to provide the state with a characterization of their waste stream. Information needed includes:

Industry Information
Contact Person
Common Name of Waste, Type
Hazardous Waste, Based on Listing According to Legislation
Hazardous Waste, Based on Characteristics (i.e., ignitable, corrosive, reactive, toxic)
Physical State Description
Quantity Generated
Disposal Procedures
Dept. of Transportation Reporting Requirements

This waste characterization is kept on file in the Department and must be updated by the industry if waste stream characteristics are changed.

The company is also required to complete a Hazardous Waste Manifest for every load of hazardous waste shipped off-site. This manifest is in compliance with both the state and federal programs. The manifest is a 6-part tracking sheet with the purpose of assuring delivery of the waste to a designated licensed disposal facility, transportation of the waste by a licensed hauler, and submittal of information on the volume and type of waste generated.

The manifests require the following information from an industry:

Facility Identification (including EPA ID No.)
Transporters Identification (including EPA ID No.)
Treatment Storage or Disposal Site (including EPA ID No.)
Waste Information:
  DOT Shipping Name and Class
  Container Number and Types
  Waste Physical Form
  Total Weight or Volume

These manifests must be certified and signed by each party involved, the generator, transporters and disposal facility. The manifest is required with each waste shipment.

The waste characterization of Act 64 also requires some of the same information as the Wastewater/Critical Materials Report (Form IV, Residuals and Residues). The difference between the two systems is that the characterization is required only once unless the waste process is changed. The Residue and Residuals Forms under the Wastewater/Critical Materials Reporting program, are required annually.

An additional difference is the scope of the Hazardous Waste Classification compared to the Critical Materials. The classification of "Hazardous Waste" includes substances on the Critical Materials Register as well as materials considered hazardous due to corrosivity and/or reactivity in addition to the toxicity of a material, the main concern in Critical Materials classification.

4.4.4 Coordination Between the Various Reporting Systems

Efforts are being made to find a common key for identifying industries reporting to programs in our department under the various pieces of legislation. This would be of assistance to the industries in Michigan and the department due to the similarity and often duplicate information required by each program. Presently, the most common information is the EPA Identification Number. This is available for all NPDES reporters and all Hazardous Waste Generators. This number was requested from the reporting industries in the Critical Materials Program for the first time in 1981. At this date, information is not available on the number of Critical Materials Industries that have responded with an EPA identification number, however, preliminary estimates predict a response rate of about 80 percent.

It is hoped that further system coordination between the various reporting programs in our department will take place with this common identification key in place. Common identification of a facility in the various reporting systems would allow cross checking and verification of reported information and be the first step in consolidating duplicative reporting requirements in the different pieces of legislation.

Chapter 5

Computerized Data Programs

The TSCA Cooperative Agreement allowed the MDNR to develop a computer program with a variety of formats designed to meet MDNR program needs. The capabilities, quality control and limitations of the following data programs are given: the Master Program, the Statistical Program, the Hazard Assessment Program, and the Priority Program.

Chapter 5

Computerized Data Programs

The TSCA Cooperative Agreement allowed MDNR staff to develop computer program support for three primary areas of the Critical Materials Program. These areas involved:

1. Tabulation and summarization of data collected from Wastewater/Critical Materials Reports.
2. Tabulation and summarization of data collected from the hazard assessment of chemicals evaluated for inclusion in the Critical Materials Register.
3. Prioritization of industries with Critical Materials present in their discharge and municipal treatment plants receiving industrial effluents containing Critical Materials according to hazard and environmental factors associated with the discharges.

The Master Program, Statistical Program, Hazard Assessment Program and Priority Program were developed to handle, classify and present data in a variety of formats designed to meet MDNR program needs. This chapter explains the computer systems and associated programs that were developed from a user's standpoint. MDNR data analysts have prepared detailed program documentation and instruction to aid interested parties in establishing comparable programs (Appendix C).

5.1 Master Program

The Master Program primarily utilizes data from the industrial Wastewater/

Critical Materials reports. The data report outputs available in this program are the CMR Discharge format and Mailing List format. The CMR discharge format is more comprehensive, displaying all the information contained in the data base for a facility. The mailing list format contains only general information on the facility (i.e., location, industrial classification, etc.).

5.1.1 Capabilities

The first step in requesting information from the Master Program is choosing the appropriate report format, CMR Discharge or Mailing List (Ex. 5-1). Sort options or combinations of options for organizing retrieved data include:

1. Facility number - lists facility records in numerical order according to the unique 6 digit number (these numbers have been assigned to Michigan industries by MDNR).

2. Facility name - lists facility records in alphabetical order.

3. Zip code - organize facilities according to zip code of mailing address.

4. Water Quality District - organizes facilities according to specified geographic boundaries (MDNR in-house system).

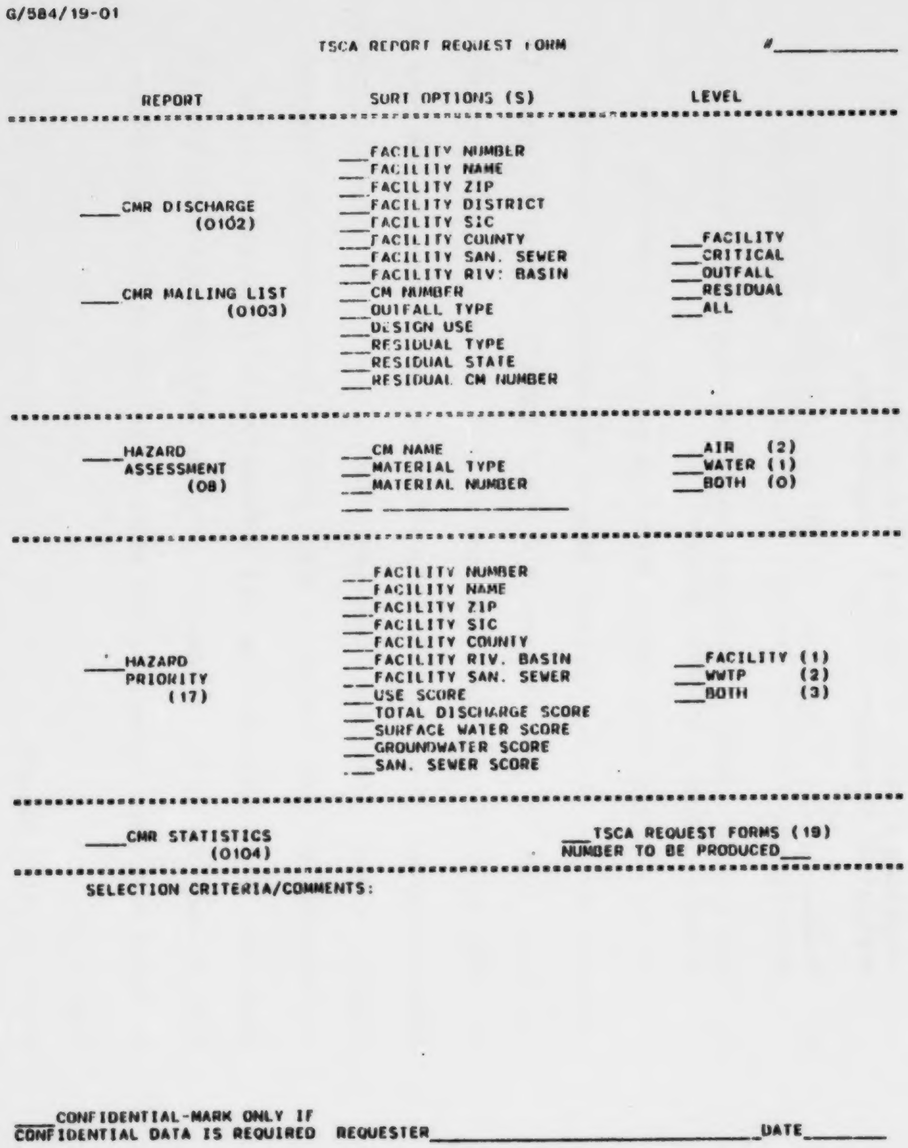
5. Facility SIC - places facilities in groups according to their 4 digit Standard Industrial Classification that best describes the nature of a facilities business (i.e., 3320 - iron and steel foundry).

6. Facility county - organize facilities by county where plant site is located.

7. Facility sanitary sewer - organizes facilities according to treatment plants that receive the facility's wastewater. (Sanitary sewers are identified by a 6 digit number assigned to all municipal wastewater plants by Wastewater Operations, MDNR).

8. River basin - groups facilities with surface water discharges according to river basin (a seven digit number taken from U.S. EPA Basin Code list identifying a river, creek, canal, drain or shoreline in a given watershed (river basin).

Exhibit 5-1 TSCA Report Request Form



```
G/584/19-01
                       TSCA REPORT REQUEST FORM                  #__________

         REPORT              SORT OPTIONS (S)              LEVEL
=============================================================================
                       ___FACILITY NUMBER
                       ___FACILITY NAME
                       ___FACILITY ZIP
  ___CMR DISCHARGE     ___FACILITY DISTRICT
           (0102)      ___FACILITY SIC
                       ___FACILITY COUNTY               ___FACILITY
                       ___FACILITY SAN. SEWER           ___CRITICAL
                       ___FACILITY RIV. BASIN           ___OUTFALL
  ___CMR MAILING LIST  ___CM NUMBER                     ___RESIDUAL
              (0103)   ___OUTFALL TYPE                  ___ALL
                       ___DESIGN USE
                       ___RESIDUAL TYPE
                       ___RESIDUAL STATE
                       ___RESIDUAL CM NUMBER
=============================================================================
  ___HAZARD            ___CM NAME                       ___AIR   (2)
     ASSESSMENT        ___MATERIAL TYPE                 ___WATER (1)
           (08)        ___MATERIAL NUMBER               ___BOTH  (0)
                       ___ _______________
=============================================================================
                       ___FACILITY NUMBER
                       ___FACILITY NAME
                       ___FACILITY ZIP
                       ___FACILITY SIC
                       ___FACILITY COUNTY
  ___HAZARD            ___FACILITY RIV. BASIN           ___FACILITY (1)
     PRIORITY          ___FACILITY SAN. SEWER           ___WWTP     (2)
        (17)           ___USE SCORE                     ___BOTH     (3)
                       ___TOTAL DISCHARGE SCORE
                       ___SURFACE WATER SCORE
                       ___GROUNDWATER SCORE
                       ___SAN. SEWER SCORE
=============================================================================
  ___CMR STATISTICS                          ___TSCA REQUEST FORMS (19)
           (0104)                            NUMBER TO BE PRODUCED___
=============================================================================
     SELECTION CRITERIA/COMMENTS:




____CONFIDENTIAL-MARK ONLY IF
CONFIDENTIAL DATA IS REQUIRED  REQUESTER____________________________DATE_______
```

9. CM number - organizes the facilities by parameter number assigned to individual Critical Materials.

10. Outfall type - organizes facility by type of discharge reported (i.e., surface water, groundwater etc.) for their outfall.

11. Design use - organizes the facilities by designated use of surface waters receiving their discharge (i.e., domestic water supply, recreation, etc.; MDNR in-house classification).

12. Residual type - organizes facilities reporting residuals into groups according to type of residual (i.e. production process residual, wastewater treatment residual, combination).

13. Residual state - organizes facilities reporting residuals into groups according to state of residual (i.e., liquid, sludge, solid).

14. Residual CM number - organizes facilities reporting a specific critical material present in their residual

If the CMR discharge report format is chosen, the user can also elect to receive all the facility data or any combination of information collected from the four Wastewater/Critical Materials forms (Chapter 4). The level of reporting displayed is part of the flexibility of the Master Program. The output of information can be tailored to the user's request, without including unnecessary data. The levels consist of general information, Critical Materials data, outfall descriptions and residual data (Ex. 5-2). The mailing list information is displayed in a one line format (Ex. 5-3). A computer printout code interpretation key is supplied with each request to aid users unfamiliar with the printouts (Ex. 5-4).

5.1.2 Quality Control

A quality control (error detection) program was developed to simplify future Wastewater/Critical Materials Report form review and compliance follow-up, and enhance the quality of the data used by the master program.

Exhibit 5-2 Critical Materials Register Master Printout

```
G/584/02                                  MICHIGAN DEPARTMENT OF NATURAL RESOURCES                               PAGE    39
RUN DATE- 09/10/82                          BUREAU OF ENVIRONMENTAL PROTECTION
                                         CRITICAL MATERIALS REGISTER MASTER PROGRAM

-----------------------------------------------------------------------------------------------------------------------
FACILITY- 926263   EPA ID-
COPCO STEEL CO
                            DISTRICT:           3     OUTFALLS:                      00        CRITICAL MAT:         N
343 GRANDVILLE AVE SW       COUNTY:            41     MAJOR DISCHARGE:                         SANITARY SEWER: 410032
GRAND RAPIDS        MI   49503    RIVER BASIN: 0828030     TOT. AVG. DAILY DISC:     .0000        SIC:                3312
                        -----------------------------------------------------------------------------------------------
                        OUTFALL:     926263           % PROCESS:    0               AVG. DAILY FLOW:     .0008
                        TYPE:             8           % COOLING:   90               MAX. DAILY FLOW:     .0012
                        DESIGN USE:                   % SANITARY:  10               TOT. ANN. FLOW:        0.2
                        GPSF:           001                                         DROUGHT FLOW:       999999
-----------------------------------------------------------------------------------------------------------------------
FACILITY- 952088   EPA ID-MIG000000563
JAMES STEEL & TUBING CO
DIV AVIS INDUSTRIAL CORP    DISTRICT:           1     OUTFALLS:                      00        CRITICAL MAT:         N
PO BOX 545                  COUNTY:            63     MAJOR DISCHARGE:                         SANITARY SEWER: 820214
MADISON HEIGHTS     MI   48071    RIVER BASIN: 0613100     TOT. AVG. DAILY DISC:     .0000        SIC:                3312
                        -----------------------------------------------------------------------------------------------
                        OUTFALL:     952088           % PROCESS:    0               AVG. DAILY FLOW:     .0300
                        TYPE:             8           % COOLING:  100               MAX. DAILY FLOW:     .0300
                        DESIGN USE:                   % SANITARY:   0               TOT. ANN. FLOW:        7.0
                        GPSF:           001                                         DROUGHT FLOW:       999999
-----------------------------------------------------------------------------------------------------------------------
FACILITY- 500086   EPA ID-MID046067203
JONES & LAUGHLIN STEEL CORP
STEEL CORP                  DISTRICT:           1     OUTFALLS:                      00        CRITICAL MAT:         Y
21400 MOUND RD              COUNTY:            50     MAJOR DISCHARGE:                         SANITARY SEWER: 500052
WARREN              MI   48090    RIVER BASIN: 0614151     TOT. AVG. DAILY DISC:     .0000        SIC:                3312
                        -----------------------------------------------------------------------------------------------
                           CRITICAL MATERIAL(S)     CON.         USE.          DIS.       RES.       GPS OUTFALLS
                        NICKEL                               26500000           4          0      001
                        COPPER                                      1           3          0      001
                        CHROMIUM                             66000000           5     360000      001
                        -----------------------------------------------------------------------------------------------
                        OUTFALL:     500086           % PROCESS:   30               AVG. DAILY FLOW:    1.0382
                        TYPE:             8           % COOLING:   67               MAX. DAILY FLOW:    1.1259
                        DESIGN USE:                   % SANITARY:   3               TOT. ANN. FLOW:      378.9
                        GPSF:           001                                         DROUGHT FLOW:       999999
                        -----------------------------------------------------------------------------------------------
                        PRODUCTION RESIDUAL 500086P
                           PHYSICAL STATE: 4   SOLVENT: 1   RESIDUE: 9   AMOUNT: 2046000 P     DISPOSAL: 000  STORAGE: 5
                             CRITICAL MATERIAL:  CHROMIUM
                        -----------------------------------------------------------------------------------------------
                        PRODUCTION RESIDUAL 500086P
                           PHYSICAL STATE: 4   SOLVENT: 1   RESIDUE: 9   AMOUNT: 7200000 P     DISPOSAL: 000  STORAGE: 000
                             CRITICAL MATERIAL:  CHROMIUM
-----------------------------------------------------------------------------------------------------------------------
FACILITY- 580294   EPA ID-MID087054078
NORTH STAR STEEL COMPANY
                            DISTRICT:           1     OUTFALLS:                      00        CRITICAL MAT:         N
3000 EAST FRONT ST PO BOX 1200  COUNTY:        58     MAJOR DISCHARGE:                         SANITARY SEWER: 580095
MONROE              MI   48161    RIVER BASIN: 0000000     TOT. AVG. DAILY DISC:     .0000        SIC:                3312
```

Exhibit 5-3 Critical Materials Register Mailing List

```
G/584/03                              MICHIGAN DEPARTMENT OF NATURAL RESOURCES                               PAGE     2
RUN DATE- 04/20/82                      BUREAU OF ENVIRONMENTAL PROTECTION
                                      CRITICAL MATERIALS REGISTER MAILING LIST

FACILITY        NAME                    ATTEN                    STREET             CITY            ZIP  CO RIV.BAS. SEWER  SIC
 955298   AJAX ROLLED RING CO      DIV AJAX ASSOCIATED COMP 36850 VAN BORN RD PO BOX WAYNE           48184 82 0000000 820214 3462
 952830   ALADDIN CUTTING TOOL CO                           25820 NOVI RD            NOVI            48050 63 0000000 000000 3490
 911343   ALBION INDUSTRIES DIV                             1101 INDUSTRIAL AVE      ALBION          49224 13 0000000 130026 3565
 951036   ALCOTE INCORPORATED      434 E MILWAUKEE                                   DETROIT         48202 82 0613100 820214 3479
 932500   ALDOA CO                                          12727 WESTWOOD           DETROIT         48223 82 0613100 820214 2890
 170032   ALGOMA TUBE CORPORATION  TUBE DIV #1 R MCBAIN PLA 503 QUEEN ST EAST        SAULT STE MARI  49783 17 0000000 000000 3317
 924474   ALGONAC CAST PRODUCTS    9300 STONE RD            9300 STONE RD PO BOX 479 ALGONAC         48001 74 0000000 000000 3362
 933513   ALICE DORIS & RAY ROBERT HURON LAUNDRY OR ALICE R 224 S HURON AVE          HARBOR BEACH    48441 32 0000000 320049 7210
 911470   ALL AMERICAN WASH N WAX  STEVEN C MUNGER          34445 MICH               WAYNE           48184 82 0613100 820214 7542
 820634   ALL PRODUCTS CO          JIM DICKINSON            333 GRACE STREET         FARWELL         48622 18 0000000 180033 3465
 630524   ALLAN TOOL & MACH CO INC 1822 E MAPLE RD                                   TROY            48084 63 0614151 820214 3450
 930198   ALLARDS CULLIGAN SERVICE                          611 N WASHINGTON AVE     LUDINGTON       49431 53 0821030 530036 7399
 030012   ALLEGAN METAL FINISHING                           1274 LINCOLN ROAD EAST   ALLEGAN         49010 03 0830992 000000 3471
 700218   ALLEN EXTRUDERS INC      323 ROOSEVELT            323 ROOSEVELT PO BOX 60  ZEELAND         49464 70 0829020 700078 3079
 880508   ALLEN GROUP INC          ALLEN TESTPRODUCTS DIV   2101 N PITCHER ST        KALAMAZOO       49007 39 0830030 390051 3690
 934160   ALLENS QUALITY CLEANERS  JAMES E ALLEN            713 HURON AVE            PORT HURON      48060 74 0615110 740058 7210
 951629   ALLIED AUTOMATION SYSTEM DIV OF SPARTON G A PUSCA 17333 HEALY              DETROIT         48212 82 0613100 820214 3490
 390183   ALLIED CHEMICAL COMPANY  KALAMAZOO WORKS          511 E PATERSON ST        KALAMAZOO       49007 39 0830030 390051 2810
 820312   ALLIED CHEMICAL CORP.    IND CHEM DIV             800 MARION AVE., PO BOX  RIVER ROUGE     48218 82 0613100 820198 2810
 939258   ALLIED CHUCKER & ENGINEE                          3529 SCHEELE DR          JACKSON         49202 38 0828030 380029 3470
 820282   ALLIED CORPORATION       DETROIT TAR PLANT        PO BOX 33950             DETROIT         48232 82 0613100 820214 2865
 932927   ALLIED FILM LABORATORY I                          7375 WOODWARD AVE        DETROIT         48202 82 0613100 820214 3990
 990020   ALLIED FINISHING         CARL NEUNDORF            4100 BROADMOOR SE        GRAND RAPIDS    49508 41 0000000 410032 3471
 935985   ALLIED GRAPHICS ART INC                           17196 WYOMING AVE        DETROIT         48221 82 0613100 820214 2790
 630387   ALLIED KELITE                                     364 MIDLAND AVE          HIGHLAND PARK   48203 82 0000000 820214 2890
 820985   ALLIED OIL CO            325 GREAT LAKES AV       PO BOX 86                RIVER ROUGE     48218 82 0613100 000000 4230
 390004   ALLIED PAPER INCORPORATE BRYANT MILL U G STOEFFLE 2030 PORTAGE STREET      KALAMAZOO       49001 39 0830030 390051 2621
 500165   ALLIED PROD CORP         WOLVERINE BOLT DIV WARRE 22001 HOOVER RD          WARREN          48208 50 0614151 500052 3471
 820733   ALLIED PROD CORP         WOLVERINE BOLT DIV DETRO 9685 GRINNELL AVE        DETROIT         48213 82 0613100 820214 3450
 300068   ALLIED PRODUCTS CORP     DIE & PROTOTYPE DIV      235 E BACON ST           HILLSDALE       49242 30 0832010 000000 3540
 954547   ALLOY METALS INC                                  501 EXECUTIVE DR         TROY            48084 63 0000000 820214 3340
 938247   ALLOY STEEL TREATING CO                           M 40 SOUTH               GOBLES          49055 80 0000000 000000 3398
 410012   ALLOYTEK INC             R SHAVALIER PLANT ENGR.  2900 WILSON AVE          GRANDVILLE      49418 41 0828030 410034 3720
 290048   ALMA FREEZER CO                                   1724 W MONROE RD         ST LOUIS        48880 29 0000000 290019 2011
 260017   ALMA PLASTICS CO         KAL PLANT                4378 S M 18 PO BOX 527   BEAVERTON       48612 26 0000000 000000 3079
 290004   ALMA PRODUCTS CO         PLANT 1 MICHIGAN AVE     2000 E MICHIGAN AVE      ALMA            48801 29 2104039 290014 3714
 990942   ALMA PRODUCTS CO         PLANT 2 COURT ST         2000 MICHIGAN AVE        ALMA            48801 29 0000000 290014 3714
 929123   ALMO MANIFOLD ( TOOL CO                           11444 KALTZ              WARREN          48089 50 0614151 500052 3440
 927894   ALMOND ENTERPRISES INC   ATT KEN ALMOND           1239 E BROADWAY          MUSKEGON        49444 61 0827994 610245 3479
 440043   ALMONT MFG CO            355 EAST THIRD ST                                 IMLAY CITY      48444 44 0615061 440007 3320
 410152   ALOFS MFG. CO.                                    345 32ND ST.             GRAND RAPIDS    49508 41 0828030 410033 3465
 924523   ALPENA CEMENT PROD CO IN                          600 W CAMPBELL ST        ALPENA          49707 04 2110010 040033 3271
 934762   ALPENA NEWS                                       130 PARK PL              ALPENA          49707 04 2110010 040033 2710
 890575   ALPHA METAL FINISHING CO 1200 N MAIN              1206 N MAIN ST           ANN ARBOR       48104 81 0612100 810039 3300
 954550   ALPHA-DEBON INDUSTRIES I                          32655 INDUSTRIAL DR      MADISON HGTS    48071 63 0000000 820214 3444
 890634   ALPINE CLEANERS          706 W HURON              908 W HURON              PONTIAC         40053 63 0614150 630406 7210
 934096   ALPINE PLAZA LNDRY & CLN CHARLES GLEN CATT        150 S WISCONSIN          GAYLORD         49735 69 0000000 690007 7210
 933637   ALPINE THRIFTYMAT        BILL NICHOLS             2530 ALPINE AVE N W      WALKER          49504 41 0828030 410032 7215
 911180   ALS AUTO WASH            AL MAZZENGA              12101 MORANG             DETROIT         48224 82 0613100 820214 7542
 630350   ALSAR INC                21121 TELEGRAPH ROAD                              SOUTHFIELD      48075 63 0613100 820214 3479
 120027   AMAX SPECIALTY METALS CO A E COLE                 460 JAY ST               COLDWATER       49036 12 0832014 120020 3330
 940402   AMBASSADOR HOTEL INC     HO JO DOWNTOWN MOTOR LOD 231 MICHIGAN AVE         DETROIT         48226 82 0613100 820214 7011
```

Exhibit 5-4 Critical Materials Register-Master Program

Computer Print-out Codes

PART I Facility Information

OUTFALL:	Surface Water discharge only
DISC:	Discharge
CRITICAL MATERIALS:	Y= Yes/ N= No
SIC:	Standard Industrial Classification Code

PART II Critical Materials Information

CON:	Confidential
USE:	Usage
NCOS:	Nonconsumptive Usage
DIS:	Discharge
RES:	Residual

Poundage Codes:

- 0= 0 lbs.
- 1= less than 1 lb.
- 2= 1-10 lbs.
- 3= 11-100 lbs.
- 4= 101-500 lbs.
- 5= 501-1000 lbs.
- 6= 1001-10,000 lbs.

If over 10,000 lbs., the amount of pounds to the nearest 10,000 is printed.

PART III Outfall Information

TYPE:

- 1= Surface Waters (River, Stream, Storm Sewer, Lake, etc.)
- 2= Lagoon or Seepage Pond with No outlets
- 3= Spray Irrigation
- 4= Septic Tank--Tile Field
- 5= Deep Well Disposal
- 6= Surface of Ground
- 7= Other
- 8= Municipal Sanitary Sewer

DESIGN USE: Designated Use

- A1= Domestic Water Supply
- B1= Recreation- Total Body Contact
- C1= Cold Water Fish Species
- C2= Warm Water Fish Species

GPSF: Outfall Number given by the Facility

AVG. and MAX. DAILY FLOW: reported in Millions of Gallons

Exhibit 5-4 (con't.)

PART IV Residual Information

WASTEWATER RESIDUAL: Facility Number/P or W

W= Wastewater Treatment Residual

P= Production Process Residual

PHYSICAL STATE:
1= Liquid
2= Heavy Sludge
3= Wet Solid
4= Dry Solid

SOLVENT:
1= Water
2= Oil
3= Chemical Solvent

RESIDUE:
1= Chemical Production
2= Food Processing
3= Machining
4= Dust Collection
5= Paint Booths
6= Water Treatment
7= Process Water
8= Sanitary Sewer
9= Other

AMOUNT:
C= Cubic Yards
G= Gallons
P= Pounds

DISPOSAL:
1= Public Landfill
2= Private Landfill
3= Own Land
4= Shipped Out of State
5= Incinerator
6= Other

STORAGE:
1= Metal Drums
2= Fiber Drums
3= Above Ground Tank
4= Underground Tank
5= Stockpiled on Ground
6= Holding Pond/ Lagoon
7= Other

CRITICAL MATERIAL: Critical Materials present in the residual

After the report forms are manually reviewed, the information is keypunched onto the data bank. The edit program can be utilized any time after data entry. The program identifies common errors on reported information (Ex. 5-5). The errors identified for Critical Materials Reports include:

1. A Critical Material is reported by a facility with pounds used and pounds discharged being zero.
2. Critical Materials discharge code is greater than zero and critical materials use code is zero.
3. Critical materials residual code is greater than zero (indicating a residual is present) and no Form IV is on file.
4. Form IV is on file and contains no Critical Materials.
5. Form IV is on file and Form III(s) are absent.
6. Form III and/or Form IV are on file without a Wastewater Outfall Report (Form II).

The quality control program has greatly reduced the review time and increased the accuracy of the wastewater report forms. However, the program is still being evaluated to increase its capabilities. The edit program can only detect errors on data that have been keypunched into the computer. Data entered on forms depicting special situations (i.e., trace contaminant use of Critical Materials) or written comments sent to the department via the report forms can be found only through manual inspection of the report forms.

5.1.3 Limitations

Limitations of the Master Program and Wastewater/Critical Materials data base are primarily dependent upon the integrity of the reporting facilities and the intended use of the data. Some of the limitations

Exhibit 5-5 Master Program Error Detection

```
************************************************************************
*                                                                      *
*          WATER SURVEILLANCE DATA EDIT CODES  -                       *
*                                                                      *
* ERROR NO.                DESCRIPTION                                 *
*                                                                      *
*  FEE-RELATED ERRORS:                                                 *
*    1 - NO OUTFALL WITH FEE APPLICABILITY = R                         *
*    2 - NO OUTFALL WITH FEE APPLICABILITY = A OR B OR G OR H          *
*    3 - RATING IS A, B, OR 1 AND FEE DUE = ZERO                       *
*                                                                      *
*  FACILITY LEVEL ERRORS:                                              *
*    4 - DISTRICT IS ZERO OR BLANK                                     *
*                                                                      *
*  OUTFALL LEVEL ERRORS:                                               *
*    6 - CRITICAL OR RESIDUAL PAGES EXIST WITHOUT OUTFALL PAGES        *
*    7 - # OF DAYS DISCHARGED REPORTED AS > 366  OR  = ZERO            *
*    8 - TYPE IS NOT = 1, 2, 3, 4, 5, 6, 7, OR 8                       *
*    9 - TYPE = 1 AND % SANITARY > 1 AND NEITHER PARAMETERS            *
*         56 NOR 57 APPEAR AS CONSTITUENT PARAMETERS                   *
*   10 - TYPE = 2-7 AND DROUGHT FLOW NOT = 999999                      *
*         AND DU NOT = A1                                              *
*   11 - AVERAGE DAILY FLOW IS ZERO OR BLANK                           *
*   12 - TYPE = 1-7 AND  DU = BLANK OR DROUGHT FLOW = ZERO             *
*         AND SURVEY-FACTOR NOT = ZERO                                 *
*   13 - % PROCESS + % COOLING + % SANITARY  NOT = 100 %               *
*   14 - DROUGHT FLOW = 0 AND DU = A1 OR B1                            *
*   15 - DROUGHT FLOW = 100000 AND DU NOT = C1                         *
*   16 - DROUGHT FLOW = 999999 AND DU NOT = A1 OR B1 OR C1             *
*         AND SURVEY-FACTOR NOT = ZERO                                 *
*   17 - OUTFALL-CRITICAL-MATERIALS = "Y" AND NO                       *
*         CONSTITUENT  PARAMETERS                                      *
*   18 - OUTFALL-CRITICAL-MATERIALS = "Y" AND PIP = "N"                *
*   19 - INTENSIVE SURVEILLANCE = "Y" AND TYPE NOT = 1                 *
*   20 - VARIABILITY < 1.0                                             *
*                                                                      *
*  CRITICAL AND RESIDUAL LEVEL ERRORS:                                 *
*   32 - CRITICAL MATERIALS PARAMETER OCCURS AND                       *
*         LBS USED AND LBS DISCHARGED = ZERO.                          *
*   33 - CM DISCHARGE CODE > ZERO AND                                  *
*         CM USED CODE IS ZERO.                                        *
*   34 - CM RESIDUAL DISCHARGE CODE > ZERO AND                         *
*         NO RESIDUAL PAGE IS ON FILE                                  *
*   35 - RESIDUAL PAGE IS ON FILE AND                                  *
*         NO RESIDUAL CM PARAMETER NUMBERS                             *
*   36 - RESIDUAL PAGE IS ON FILE AND                                  *
*         NO CRITICAL MATERIAL PAGES ARE ON FILE                       *
*                                                                      *
************************************************************************
```

```
FACILITY-- 580106   OUTFALL-- 580356   ERROR-- (12)        UNION CAMP CORP                     2631
FACILITY-- 580106   OUTFALL-- 580356   ERROR-- (16)        UNION CAMP CORP                     2631

FACILITY-- 580112   ERROR-- (32)                           CONSUMERS POWER CO                  4911

FACILITY-- 580123   OUTFALL-- 580125   ERROR-- (16)        DETROIT EDISON CO                   4911

FACILITY-- 580129   ERROR-- (33)                           DETROIT EDISON CO                   4911
FACILITY-- 580129   OUTFALL-- 580127   ERROR-- ( 7)        DETROIT EDISON CO                   4911

FACILITY-- 580173   ERROR-- (34)                           DANA CORP                           7391

FACILITY-- 580186   OUTFALL-- 580186   ERROR-- ( 7)        FRANCE STONE COMPANY                1422
FACILITY-- 580186   OUTFALL-- 580186   ERROR-- (16)        FRANCE STONE COMPANY                1422

FACILITY-- 580188   OUTFALL-- 580188   ERROR-- ( 7)        GUARDIAN IND CORP                   3200
FACILITY-- 580188   OUTFALL-- 580188   ERROR-- (16)        GUARDIAN IND CORP                   3200
FACILITY-- 580188   OUTFALL-- 580189   ERROR-- (16)        GUARDIAN IND CORP                   3200
FACILITY-- 580188   OUTFALL-- 580190   ERROR-- (16)        GUARDIAN IND CORP                   3200
FACILITY-- 580188   OUTFALL-- 580274   ERROR-- (16)        GUARDIAN IND CORP                   3200
FACILITY-- 580188   OUTFALL-- 580332   ERROR-- (16)        GUARDIAN IND CORP                   3200
FACILITY-- 580188   OUTFALL-- 580333   ERROR-- (16)        GUARDIAN IND CORP                   3200

FACILITY-- 580197   OUTFALL-- 580197   ERROR-- (16)        ASH STEVENS INC                     2890

FACILITY-- 580242   OUTFALL-- 580242   ERROR-- (16)        FRANCE STONE CO                     1422

FACILITY-- 580285   OUTFALL-- 580286   ERROR-- ( 9)        AIRCO TEMESCAL                      3220

FACILITY-- 590007   OUTFALL-- 590120   ERROR-- ( 7)        HEINZ USA                           2035

FACILITY-- 590010   OUTFALL-- 590010   ERROR-- (13)        GREENVILLE PRODUCTS CO              3632

FACILITY-- 590060   OUTFALL-- 590060   ERROR-- (12)        CEDAR LAKE FOODS                    2090
FACILITY-- 590060   OUTFALL-- 590060   ERROR-- (16)        CEDAR LAKE FOODS                    2090

FACILITY-- 590087   OUTFALL-- 590087   ERROR-- ( 9)        R J TOWER CORPORATION               3465

FACILITY-- 610033   ERROR-- (34)                           KEENE CORP.                         3560

FACILITY-- 610036   OUTFALL-- 610038   ERROR-- ( 7)        TELEDYNE CONTINENTAL MOTORS         3510
FACILITY-- 610036   OUTFALL-- 610063   ERROR-- (16)        TELEDYNE CONTINENTAL MOTORS         3510

FACILITY-- 610037   OUTFALL-- 610076   ERROR-- (16)        TELEDYNE CONTINENTAL                3795
```

identified include:

1. Lack of or falsification of information provided to the Department. Complete verification of the forms could only be achieved by intensive field investigations (Chapter 7).

2. Limitations of the statutory reporting requirements (Chapters 4, 6). It must be continually stressed to users that the data base contains only those facilities with process or non-contact cooling wastewater discharges.

3. Confusion with computer printed information and actual facility use and discharge situations. The data base has no ability to adequately handle special case situations (i.e. analytical problems in wastewater discharge analysis, historical problems, compliance issues, exceptions to reporting requirements).

4. Computer identification key inaccuracies or absence. If the report forms are not filled out completely by companies (i.e. plant location, SIC code, zip code) or coded correctly by staff for river basin and sanitary sewers, then the computer program options available for sorting and selecting facilities by these keys becomes useless. One problem that has been found arises when the mailing address of the company is different than the actual plant location. Sorting by zip code in these situations leads to inaccuracies and should be supplemented by another sort option.

5. If a Critical Material is discharged out of more than one outfall, there is no indication as to percentage breakdown of material being discharged by each outfall. This problem is primarily apparent when the outfalls listed for one material are discharging to different sources (i.e., surface water and sanitary sewer).

5.2 Statistical Program

The Statistical Program was developed to tabulate data contained in the "Critical Materials Register - Master Program". The program tabulates the minimum and maximum pounds of all Critical Materials reported used (confidential and nonconfidential), discharged or contained in residuals on an annual basis.

5.2.1 Capabilities

Information from the Statistical Program is sorted alphabetically by Critical Material name (Ex. 5-6). Select options are available that have the capability to tabulate the annual Critical Materials poundage data for individual materials or groups, by the following classifications or combinations: zip code area; Standard Industrial Classification code; river basin; county; sanitary sewer; MDNR Water Quality District; or combinations of the above.

5.2.2 Quality Control

The data is monitored by the Master Program's quality control error detection program and procedures.

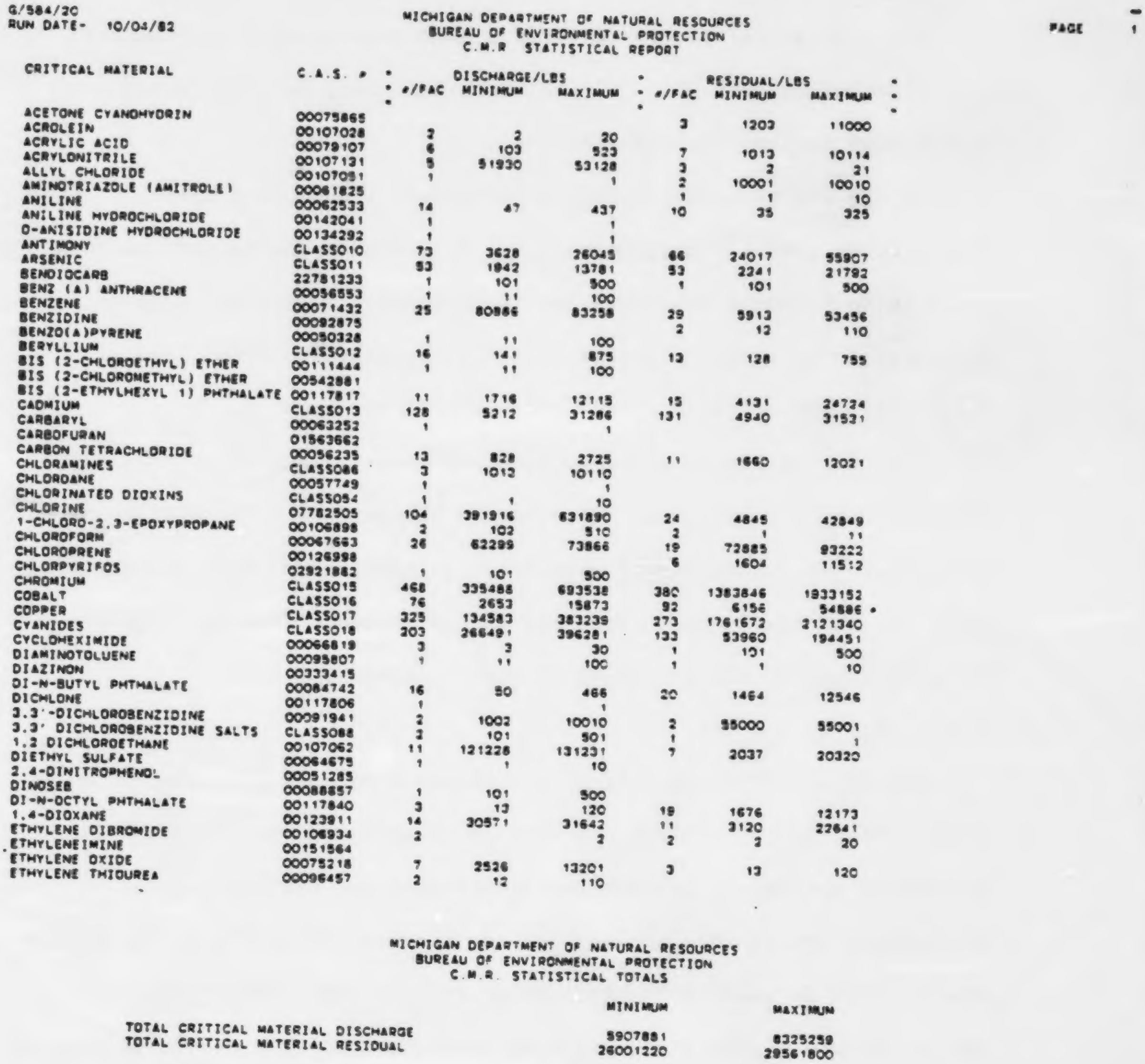
5.2.3 Limitations

1. Errors existing on the Master Program regarding usage, discharge, and/or residuals of Critical Materials affects the accuracy of the Statistical Program.
2. Tabulation using minimum and maximum poundages often presents large differences between the two and makes using the information more difficult and somewhat hypothetical.
3. Critical Materials discharge information does not always reflect the true nature of the discharge (i.e., surface water, groundwater, etc.).

5.3 Hazard Assessment Program

The Hazard Assessment program is a display of a rating system used to evaluate chemicals for possible inclusion on the Critical Materials Register or the Air Priority Chemicals list. Assessment factors for chemicals are separated into seven specific areas: 1) acute toxicity; 2) carcinogenicity; 3) hereditary mutagenicity; 4) teratogenicity; 5) other adverse effects (including subacute and chronic effects to terrestrial and aquatic life, phytoxicity and aesthetics); 6) persistence; and 7) bio-

Exhibit 5-6 Critical Materials Non-Confidential Statustical Report



G/584/20
RUN DATE- 10/04/82

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
BUREAU OF ENVIRONMENTAL PROTECTION
C.M.R STATISTICAL REPORT

PAGE 1

CRITICAL MATERIAL	C.A.S. #	DISCHARGE/LBS			RESIDUAL/LBS		
		#/FAC	MINIMUM	MAXIMUM	#/FAC	MINIMUM	MAXIMUM
ACETONE CYANOHYDRIN	00075865				3	1203	11000
ACROLEIN	00107028	2	2	20			
ACRYLIC ACID	00079107	6	103	523	7	1013	10114
ACRYLONITRILE	00107131	5	51930	53128	3	2	21
ALLYL CHLORIDE	00107051	1		1	2	10001	10010
AMINOTRIAZOLE (AMITROLE)	00061825				1	1	10
ANILINE	00062533	14	47	437	10	35	325
ANILINE HYDROCHLORIDE	00142041	1		1			
O-ANISIDINE HYDROCHLORIDE	00134292	1		1			
ANTIMONY	CLASS010	73	3628	26045	66	24017	55907
ARSENIC	CLASS011	53	1942	13781	53	2241	21792
BENDIOCARB	22781233	1	101	500	1	101	500
BENZ (A) ANTHRACENE	00056553	1	11	100			
BENZENE	00071432	25	80886	83258	29	5913	53456
BENZIDINE	00092875				2	12	110
BENZO(A)PYRENE	00050328	1	11	100			
BERYLLIUM	CLASS012	16	141	875	13	128	755
BIS (2-CHLOROETHYL) ETHER	00111444	1	11	100			
BIS (2-CHLOROMETHYL) ETHER	00542881						
BIS (2-ETHYLHEXYL 1) PHTHALATE	00117817	11	1716	12115	15	4131	24724
CADMIUM	CLASS013	128	5212	31286	131	4940	31531
CARBARYL	00063252	1		1			
CARBOFURAN	01563662						
CARBON TETRACHLORIDE	00056235	13	828	2725	11	1660	12021
CHLORAMINES	CLASS086	3	1012	10110			
CHLORDANE	00057749	1		1			
CHLORINATED DIOXINS	CLASS054	1	1	10			
CHLORINE	07782505	104	391916	631890	24	4845	42849
1-CHLORO-2.3-EPOXYPROPANE	00106898	2	102	510	2	1	11
CHLOROFORM	00067663	26	62299	73866	19	72885	93222
CHLOROPRENE	00126998				6	1604	11512
CHLORPYRIFOS	02921882	1	101	500			
CHROMIUM	CLASS015	468	335488	693538	380	1383846	1933152
COBALT	CLASS016	76	2653	15873	92	6156	54886
COPPER	CLASS017	325	134583	383239	273	1761672	2121340
CYANIDES	CLASS018	203	266491	396281	133	53960	194451
CYCLOHEXIMIDE	00066819	3	3	30	1	101	500
DIAMINOTOLUENE	00095807	1	11	100	1	1	10
DIAZINON	00333415						
DI-N-BUTYL PHTHALATE	00084742	16	50	466	20	1464	12546
DICHLONE	00117806	1		1			
3.3'-DICHLOROBENZIDINE	00091941	2	1002	10010	2	55000	55001
3.3' DICHLOROBENZIDINE SALTS	CLASS088	2	101	501	1		1
1.2 DICHLOROETHANE	00107062	11	121228	131231	7	2037	20320
DIETHYL SULFATE	00064675	1	1	10			
2.4-DINITROPHENOL	00051285						
DINOSEB	00088857	1	101	500			
DI-N-OCTYL PHTHALATE	00117840	3	13	120	19	1676	12173
1.4-DIOXANE	00123911	14	30571	31642	11	3120	22641
ETHYLENE DIBROMIDE	00106934	2		2	2	2	20
ETHYLENEIMINE	00151564						
ETHYLENE OXIDE	00075218	7	2526	13201	3	13	120
ETHYLENE THIOUREA	00096457	2	12	110			

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
BUREAU OF ENVIRONMENTAL PROTECTION
C.M.R. STATISTICAL TOTALS

	MINIMUM	MAXIMUM
TOTAL CRITICAL MATERIAL DISCHARGE	5907881	8325259
TOTAL CRITICAL MATERIAL RESIDUAL	26001220	29561800

accumulation (see Chapter 3).

5.3.1 Capabilities

The program is capable of sorting hazard assessment information by the following options: Critical Material name; material type; material number (CAS number) and total score.

It has the capacity to select individual scores in a specific category (i.e., acute toxicity ,carcinogenicity, persistence, hereditary mutagenicity, etc.) in addition to the above sorting options. Selection can also be requested for a range of scores (i.e. all chemicals scoring greater than 3 in carcinogenicity).

Information can be obtained from the scores assigned to chemicals in the air hazard category, water hazard category or a combination of both (Ex. 5-7). Each hazard assessment printout comes with an interpretation key and disclaimer. This has been programmed into the computer and prints out at the beginning of each request (Ex. 5-8).

5.3.2 Quality Control

The Hazard Assessment Program utilizes a data base developed inhouse. The quality control measures built into the various steps of the hazard assessment process lessen the need for quality control at the program level. The primary source of error for this program is data entry. Data is entered by staff using on-line procedures. The data can be checked during entry and then confirmed, using a preliminary printout showing data entered during each on-line session.

5.3.3 Limitations

This program presents only the scores of hazards assigned to chemicals and should only be used with a thorough understanding of the hazard assessment

Exhibit 5-7 Hazard Assessment Report Form

```
G/584/08                                         MICHIGAN DEPARTMENT OF NATURAL RESOURCES                             PAGE   1
RUN DATE- 11/17/80                                  BUREAU OF ENVIRONMENT PROTECTION
                                                     HAZARD ASSESSMENT REPORT FORM1

COMMON CHEMICAL NAME            CAS NUMBER TOTAL     ACUTE TOXICITY     CARCN HMUT TERT  OTHER ADVERSE EFFECTS PER  BIO DATE
                                           SCORES  TOT ORA DER AQU INH                   TOTAL ATE/AQE APE AAE

ACETALDEHYDE                    00075070  A-04-6*  2   1   *   2   1   * ---   *    *    02-1*  2   0   *   0  *--  *-- 0679
                                          W-04-6*  2   1   *   2       * ---   *    *    02-1*  2   0   *   0  *--  *-- 0679
ACETAMIDE                       00060355  A-03-7*  0   0   *   0   *   3 -PA   *    *    NS-3*  *   *   *   *  *--  *-- 0679
                                          W-03-7*  0   0   *   0       3 -PA   *    *    NS-3*  *   *   *   *  *--  *-- 0679
ACETIC ACID ETHYL ESTER         00141786  A-03-6*  1   1   *   1   *   * ---   *    *    02-1*  2   *   *   0  *--  *-- 0679
                                          W-03-6*  1   1   *   1       * ---   *    *    02-1*  2   *   *   0  *--  *-- 0679
ACETIC ANHYDRIDE                00108247  A-04-6*  2   1   *   2   *   * ---   *    *    02-1*  2   *   *   0  *--  *-- 0780
                                          W-03-7*  2   1   *   2       * ---   *    *    01-2*  1   *   *   0  *--  *-- 0780
ACETONE CYANOHYDRIN             00075865  A-09-7*  7   7   *   3   *   * ---   *    *    02-2*  2   *   *   *  *--  *-- 0579
                                          W-09-7*  7   7   *   3       * ---   *    *    02-2*  2   *   *   *  *--  *-- 0579
2-ACETYLAMINOFLUORENE           00053963  A-08-7*  1   1   *   *   *   7 -HP   *    *    NS-3*  *   *   *   *  *--  *-- 0679
                                          W-08-7*  1   1   *   *       7 -HP   *    *    NS-3*  *   *   *   *  *--  *-- 0679
ACETYL BROMIDE                  00506967  A-02-8*  2   *   *   2   *   * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
                                          W-02-8*  2   *   *   2       * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
ACETYL CHLORIDE                 00075365  A-NS-9*  *   *   *   *   *   * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
                                          W-NS-9*  *   *   *   *       * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
ACETYLENE                       00074862  A-NS-9*  *   *   *   *   *   * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
                                          W-NS-9*  *   *   *   *       * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
ACROLEIN                        00107028  A-09-6*  7   3   *   7   7   * ---   *    *    02-1*  2   *   *   0  *--  *-- 0679
                                          W-07-8*  7   3   *   7       * ---   *    *    NS-3*  *   *   *   0  *--  *-- 0679
ACRONYCINE                      07008426  A-02-8*  *   *   *   *   *   2 -SS   *    *    NS-3*  *   *   *   *  *--  *-- 0680
                                          W-02-8*  *   *   *   *       2 -SS   *    *    NS-3*  *   *   *   *  *--  *-- 0680
ACRYLAMIDE                      00079061  A-05-6*  2   2   *   *   *   * ---   *    *    03-2*  3   *   *   *  0-W  *-- 0579
                                          W-05-6*  2   2   *   *       * ---   *    *    03-2*  3   *   *   *  0-W  *-- 0579
ACRYLIC ACID                    00079107  A-07-6*  2   2   2   2   *   * ---   *    3    02-2*  2   *   *   *  *--  *-- 0679
                                          W-07-6*  2   2   2   2       * ---   *    3    02-2*  2   *   *   *  *--  *-- 0679
ACRYLONITRILE                   00107131  A-16-5*  3   3   *   2   *   7 -AP   *    3    03-2*  3   *   *   *  *--  *-- 0679
                                          W-16-5*  3   3   *   2       7 -AP   *    3    03-2*  3   *   *   *  *--  *-- 0679
ACTINOMYCIN D                   00050760  A-07-6*  3   3   *   *   *   2 -SS   *    *    02-2*  2   *   *   *  *--  *-- 0680
                                          W-07-6*  3   3   *   *       2 -SS   *    *    02-2*  2   *   *   *  *--  *-- 0650
ADIPONITRILE                    00111693  A-02-8*  2   2   *   *   *   * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
                                          W-02-8*  2   2   *   *       * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
ALACHLOR                        15972608  A-05-5*  3   1   1   3   *   * ---   *    *    02-1*  2   2   *   0  0-T  *-- 0779
                                          W-05-5*  3   1   1   3       * ---   *    *    02-1*  2   2   *   0  0-T  *-- 0779
ALDICARB                        00116063  A-09-5*  7   7   1   7   7   * ---   *    *    02-1*  2   *   *   0  0-S  *-- 0679
                                          W-09-5*  7   7   1   7       * ---   *    *    02-2*  2   *   *   0  0-S  *-- 0679
ALDRIN                          00309002  A-28-2*  7   7   *   7   *   3 -PA   *    7    03-1*  3   *   *   0  1-S  7-6 0579
                                          W-28-2*  7   7   *   7       3 -PA   *    7    03-2*  3   *   *   0  1-S  7-8 0579
ALIZARIN                        00072480  A-NS-9*  *   *   *   *   *   * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
                                          W-NS-9*  *   *   *   *       * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
ALLYL ALCOHOL                   00107186  A-03-7*  3   2   *   3   *   * ---   *    *    00-2*  *   *   *   0  *--  *-- 0680
                                          W-03-8*  3   2   *   3       * ---   *    *    NS-3*  *   *   *   0  *--  *-- 0680
ALLYL CHLORIDE                  00107051  A-07-6*  2   *   *   2   *   3 -PA   *    *    02-2*  2   *   *   *  *--  *-- 0679
                                          W-07-6*  2   *   *   2       3 -PA   *    *    02-2*  2   *   *   *  *--  *-- 0679
AMEX 820                        33629479  A-03-8*  3   1   1   3   1   * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
                                          W-03-8*  3   1   1   3       * ---   *    *    NS-3*  *   *   *   *  *--  *-- 0679
2-AMINO-ANTHRAQUINONE           00117793  A-10-7*  *   *   *   *   *   7 -AP   *    *    03-2*  3   *   *   *  *--  *-- 0680
                                          W-10-7*  *   *   *   *       7 -AP   *    *    03-2*  3   *   *   *  *--  *-- 0680
```

Exhibit 5-8 Hazard Assessment Interpretation Key

```
THE HAZARD ASSESSMENT PROCESS IS A PRIORITY RANKING - POINT ASSIGNMENT SYSTEM USED TO EVALUATE CHEMICALS FOR POSSIBLE
    INCLUSION ON THE CRITICAL MATERIALS REGISTER OR THE AIR PRIORITY CHEMICALS LIST. FACTORS OF ENVIRONMENTAL CONCERN
    FOR POTENTIALLY DELETERIOUS SUBSTANCES ARE SEPARATED INTO SEVEN SPECIFIC AREAS: 1) ACUTE TOXICITY; 2) CARCINO-
    GENICITY; 3) HEREDITARY MUTAGENICITY; 4) TERATOGENICITY; 5) OTHER ADVERSE EFFECTS (INCLUDING SUBACUTE AND CHRONIC
    EFFECTS TO TERRESTRIAL AND AQUATIC LIFE, PHYTOTOXICITY AND AESTHETICS); 6) PERSISTENCE; 7) BIOACCUMULATION.
    THE HAZARD ASSESSMENT PROCESS IS BASED ON EXTENSIVE REVIEW OF THE SCIENTIFIC LITERATURE ON PHYSCIAL, CHEMICAL,
    AND TOXICOLOGICAL PROPERTIES OF INDUSTRIAL AND AGRICULTURAL CHEMICALS. CHEMICALS ARE NUMERICALLY SCORED AS TO THEIR
    HAZARDS. THOSE CHEMICALS WHICH HAVE A TOTAL SCORE OF SEVEN POINTS OR HIGHER IN THE AIR (A) CATEGORY ARE PLACED ON THE
    AIR PRIORITY CHEMICALS LIST. THOSE CHEMICALS WHICH HAVE A TOTAL SCORE OF SEVEN POINTS OR HIGHER IN THE WATER (W) CAT-
    EGORY ARE PLACED ON THE CRITICAL MATERIALS REGISTER.

A COMPLETE EXPLANATION OF THE CRITICAL MATERIALS REGISTER AND THE HAZARD ASSESSMENT PROGRAM CAN BE FOUND IN THE PUB-
    LICATION, 'CRITICAL MATERIALS REGISTER 1980'. A COMPLETE EXPLANATION OF THE AIR PRIORITIES LIST CAN BE OBTAINED
    FROM THE OFFICE OF TOXIC MATERIALS CONTROL. FOR MORE INFORMATION ON THESE PROGRAMS

WRITE:                                                  CALL:
    MICHIGAN DEPARTMENT OF NATURAL RESOURCES                    MDNR OFFICE OF TOXIC MATERIALS CONTROL
    ENVIRONMENTAL SERVICES DIVISTON                             (517) 374-9640
    P.O. BOX 30028
    LANSING, MICHIGAN     48909
*************************************************************************************************************************

KEY:
    TOTAL SCORES

      A=AIR SCORE                               CARCN=CARCINOGENICITY                        PER=PERSISTENCE
      W=WATER SCORE                               O=ORAL ROUTE                                  S=SOIL
    ACUTE TOXICITY                                D=DERMAL ROUTE                                W=WATER
      TOT=TOTAL ACUTE TOXICITY                    I=INHALATION ROUTE                            A=AIR
      ORA=ACUTE ORAL TOXICITY                     M=MULTIPLE ROUTES                           T=SOIL AND WATER
      DER=ACUTE DERMAL TOXICITY                   R=OTHER ROUTE                                 Q=SOIL,WATER AND AIR
      AQU=ACUTE AQUATIC TOXICITY                  HP=HUMAN POSITIVE                             N-A=NOT APPLICABLE
      INH=ACUTE INHALATION TOXICITY               PH=POTENTIAL HUMAN                          BIO=BIOACCUMULATION
    OTHER ADVERSE EFFECTS                         AP=ANIMAL POSITIVE                            B=BIOACCUMULATION FACTOR
      ATE=ADVERSE TERRESTRIAL EFFECTS             PA=POTENTIAL ANIMAL                           P=LOG PARTITION COEFFICIENT
        O=ORAL ROUTE                              SS=STRONGLY SUSPECT CARCINOGEN
        D=DERMAL ROUTE                            SC=SUSPECT CARCINOGEN
        I=INHALATION ROUTE                        NC=NOT CARCINOGENIC
        M=MULTIPLE ROUTES                       HMUT=HEREDITARY MUTAGENICITY                  ALL CATEGORIES:
        R=OTHER ROUTE                           TERT=TERATOGENICITY                             *=INSUFFICIENT INFORMATION
      AQE=ADVERSE AQUATIC EFFECTS                 O=ORAL ROUTE
      APE=ADVERSE PLANT EFFECTS                   D=DERMAL ROUTE
      AAE=ADVERSE ASETHETIC EFFECTS               I=INHALATION ROUTE
                                                  M=MULTIPLE ROUTES
                                                  R=OTHER ROUTE


                                     ***** ATTENTION *****

SOME OF THE DATA HAVE BEEN ABBREVIATED ACCORDING TO PROCEDURES GENERALLY ACCEPTED BY THE SCIENTIFIC COMMUNITY.
    DUE TO THE COMPLEX AND HIGHLY TECHNICAL NATURE OF MUCH OF THE INFORMATION, CAREFUL INTERPRETATION OF THE
    DATA IS ESSENTIAL BEFORE AN ACCURATE HAZARD ASSESSMENT CAN BE MADE. INTERPRETATION OF THE INFORMATION
    BY INDIVIDUALS NOT EXPERIENCED WITH THIS SUBJECT COULD RESULT IN ERRONEOUS JUDGEMENTS OF THE HAZARDS
    ASSOCIATED WITH THESE CHEMICAL SUBSTANCES. ALL QUESTIONS ON DATA ACCURACY AND INTERPRETATION SHOULD BE
    DIRECTED TO THE OFFICE OF TOXIC MATERIALS CONTROL (517) 374-9640.
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process. Due to the complex technical nature of data assessed for chemicals in the score assignment procedure and the specific purpose of the hazard assessment, interpretation of the scores presented must be done with caution.

5.4 Priority Program

The Priority Program was originally designed to prioritize industries with Critical Materials discharges and municipal treatment plants with contributing industries reporting Critical Materials according to their theoretical potential for causing possible environmental degradation. It compares and evaluates factors from the Master Program data base, the hazard assessment data base and a unique data set of environmental factors provided by staff, for each facility or treatment plant.

The industrial facility program yields ranking scores reflecting Critical Materials use and discharge data along with environmental factors for the total discharge, surface water discharge, groundwater discharge, municipal sanitary sewer discharge, and combined discharges (Ex. 5-9).

The municipal treatment plant program yields ranking scores reflecting Critical Materials discharged by contributing facilities and environmental factors associated with the discharge (Ex. 5-10).

Scores are calculated by using a combination of the following factors which are applicable for the industry or municipal treatment plant in question:

1. Number of Critical Materials (C.M.) used.
2. Number of C.M. discharged.
3. Pounds of C.M. discharged annually.

Exhibit 5-9 Priority Program Facility Listing

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G/584/18-01                           MICHIGAN DEPARTMENT OF NATURAL RESOURCES                              PAGE     2
RUN DATE- 06/08/81                     BUREAU OF ENVIRONMENTAL PROTECTION

   FACILITY                                                                 <---------------- SCORES ---------------->

    740046       DETROIT EDISON CO                 COUNTY       : 74         USE: 20.0        TOTAL DISCHARGE     :174.0
                 SIC: 4911                         RIVER BASIN: 0615060                         SURFACE WATER :174.0
                 ZIP: 48226                        SAN.SEWER   : 820214                         SANITARY SEWER:  0.0
                 # CRIT MAT: 17                                                                 GROUND WATER  :  0.0

    630166       GENERAL MOTORS CORP               COUNTY       : 63         USE: 57.4        TOTAL DISCHARGE     :168.3
                 SIC: 3711                         RIVER BASIN: 0690001                         SURFACE WATER : 48.0
                 ZIP: 48055                        SAN.SEWER   : 630406                         SANITARY SEWER:120.3
                 # CRIT MAT: 09                                                                 GROUND WATER  :  0.0

    390030       SIMPSON PAPER COMPANY             COUNTY       : 39         USE: 73.7        TOTAL DISCHARGE     :166.4
                 SIC: 2621                         RIVER BASIN: 0832893                         SURFACE WATER :  0.0
                 ZIP: 49097                        SAN.SEWER   : 000000                         SANITARY SEWER:  0.0
                 # CRIT MAT: 14                                                                 GROUND WATER  :166.4

    330026       GMC OLDSMOBILE DIV PLANTS 2-3     COUNTY       : 33         USE: 76.7        TOTAL DISCHARGE     :161.0
                 SIC: 3714                         RIVER BASIN: 0828030                         SURFACE WATER : 26.0
                 ZIP: 48921                        SAN.SEWER   : 330013                         SANITARY SEWER:135.0
                 # CRIT MAT: 10                                                                 GROUND WATER  :  0.0

    250003       GENERAL MOTORS CORP               COUNTY       : 25         USE:108.6        TOTAL DISCHARGE     :148.2
                 SIC: 3714                         RIVER BASIN: 2104034                         SURFACE WATER :  0.0
                 ZIP: 48556                        SAN SEWER   : 250022                         SANITARY SEWER:148.2
                 # CRIT MAT: 16                                                                 GROUND WATER  :  0.0

    820384       DETROIT EDISON CO                 COUNTY       : 82         USE: 19.0        TOTAL DISCHARGE     :135.8
                 SIC: 4911                         RIVER BASIN: 0613100                         SURFACE WATER :135 8
                 ZIP: 48226                        SAN.SEWER   : 820214                         SANITARY SEWER:  0.0
                 # CRIT MAT: 17                                                                 GROUND WATER  :  0.0

    630601       GENERAL MOTORS CORP               COUNTY       : 63         USE: 43.0        TOTAL DISCHARGE     :128.4
                 SIC: 3710                         RIVER BASIN: 0614150                         SURFACE WATER :  0.0
                 ZIP: 48053                        SAN.SEWER   : 630406                         SANITARY SEWER:128.4
                 # CRIT MAT: 07                                                                 GROUND WATER  :  0.0

    410099       KNAPE ( VOGT MFG CO               COUNTY       : 41         USE: 58.0        TOTAL DISCHARGE     :123.0
                 SIC: 3471                         RIVER BASIN: 0828030                         SURFACE WATER :  0.0
                 ZIP: 49505                        SAN.SEWER   : 410032                         SANITARY SEWER:123.0
                 # CRIT MAT: 08                                                                 GROUND WATER  :  0.0

    810113       GENERAL MOTORS CORP               COUNTY       : 81         USE: 30.0        TOTAL DISCHARGE     :122.4**
                 SIC: 3714                         RIVER BASIN: 0612130                         SURFACE WATER : 24.4
                 ZIP: 48197                        SAN.SEWER   : 810181                         SANITARY SEWER: 98.0
                 # CRIT MAT: 10                                                                 GROUND WATER  :  0.0

    390171       UPJOHN COMPANY HENRIETTA ST       COUNTY       : 39         USE: 47.5        TOTAL DISCHARGE     :114.3**
                 SIC: 2830                         RIVER BASIN: 0830030                         SURFACE WATER :  0.0
                 ZIP: 49001                        SAN.SEWER   : 390051                         SANITARY SEWER:114.3
                 # CRIT MAT: 17                                                                 GROUND WATER  :  0.0

      ** DISCHARGE SCORE AS PRINTED MAY BE ERRONEOUS DUE TO MISSING REQUIRED INFORMATION
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Exhibit 5-10 Priority Program Wastewater Treatment Plant Listing

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G/584/18-02                           MICHIGAN DEPARTMENT OF NATURAL RESOURCES                          PAGE    2
RUN DATE 06/22/81                       BUREAU OF ENVIRONMENTAL PROTECTION
                                            WASTEWATER TREATMENT PLANT

      810030       YPSILANTI              %INDUSTRIAL VOL W/CM OF INFLUENT: 15.7%    PRIORITY SCORE:   398.7**
                   COUNTY:81-T03SR07ES16  %EFFLUENT OF RECEIVING STREAM    :100.0%
                   RIVER BASIN:0612100    DESIGN USE OF RECEIVING STREAM   :C2

      380029       JACKSON                %INDUSTRIAL VOL W/CM OF INFLUENT: 18.1%    PRIORITY SCORE:   363.7**
                   COUNTY:38-T02SR01WS22  %EFFLUENT OF RECEIVING STREAM    :100.0%
                   RIVER BASIN:0000000    DESIGN USE OF RECEIVING STREAM   :C2

      820198       WYANDOTTE (WAYNE CO)   %INDUSTRIAL VOL W/CM OF INFLUENT: 02.2%    PRIORITY SCORE:   317.9**
                   COUNTY:82-T03SR11ES32  %EFFLUENT OF RECEIVING STREAM    : 00.1%
                   RIVER BASIN:0000000    DESIGN USE OF RECEIVING STREAM   :C2

      130027       BATTLE CREEK           %INDUSTRIAL VOL W/CM OF INFLUENT: 29.3%    PRIORITY SCORE:   279.9
                   COUNTY:13-T01SR08WS29  %EFFLUENT OF RECEIVING STREAM    : 12.1%
                   RIVER BASIN:0830031    DESIGN USE OF RECEIVING STREAM   :C2

      410033       WYOMING                %INDUSTRIAL VOL W/CM OF INFLUENT: 16.7%    PRIORITY SCORE:   266.0**
                   COUNTY:41-T06NR12WS04  %EFFLUENT OF RECEIVING STREAM    : 02.4%
                   RIVER BASIN:0828036    DESIGN USE OF RECEIVING STREAM   :C2

      810039       ANN ARBOR              %INDUSTRIAL VOL W/CM OF INFLUENT: 19.4%    PRIORITY SCORE:   250.3
                   COUNTY:81-T02SR06ES36  %EFFLUENT OF RECEIVING STREAM    : 96.3%
                   RIVER BASIN:0612100    DESIGN USE OF RECEIVING STREAM   :C2

      110159       BENTON HAR/ST. JOE     %INDUSTRIAL VOL W/CM OF INFLUENT: 12.0%    PRIORITY SCORE:   219.6
                   COUNTY:11-T04SR19WS24  %EFFLUENT OF RECEIVING STREAM    : 00.9%
                   RIVER BASIN:0832010    DESIGN USE OF RECEIVING STREAM   :C2

      460028       ADRIAN                 %INDUSTRIAL VOL W/CM OF INFLUENT: 11.6%    PRIORITY SCORE:   178.5
                   COUNTY:46-T06SR03ES25  %EFFLUENT OF RECEIVING STREAM    : 61.7%
                   RIVER BASIN:0611050    DESIGN USE OF RECEIVING STREAM   :C2

      610080       WHITEHALL/MONTAGUE     %INDUSTRIAL VOL W/CM OF INFLUENT:242.2%    PRIORITY SCORE:   155.3
                   COUNTY:61-T12NR17WS23  %EFFLUENT OF RECEIVING STREAM    : 00.2%
                   RIVER BASIN:0823040    DESIGN USE OF RECEIVING STREAM   :C1

      090029       BAY CITY               %INDUSTRIAL VOL W/CM OF INFLUENT: 09.1%    PRIORITY SCORE:   150.3
                   COUNTY:09-T14NR05ES15  %EFFLUENT OF RECEIVING STREAM    : 03.0%
                   RIVER BASIN:2104030    DESIGN USE OF RECEIVING STREAM   :C2

   ** DISCHARGE SCORE AS PRINTED MAY BE ERRONEOUS DUE TO MISSING REQUIRED INFORMATION
```

4. Degree of hazard associated with each C.M.

In addition, discharge specific factors are evaluated for each of the following discharge situations:

1. Surface Water Discharge
    a. Percent flow of receiving stream.
    b. Designated use of receiving stream.
2. Groundwater Discharges
    a. Classification of groundwater aquifer (i.e., protected, sensitive, unknown)
    b. Distance to nearest well or surface water
3. Sanitary Sewer Discharge
    a. Percent flow of receiving municipal treatment plant influent.
    b. Percent municipal treatment plant effluent flow of receiving stream.
4. Specific factors unique to municipal treatment plant prioritization include:
    a. Percent industrial volume of treatment plant influent.
    b. Percent municipal treatment plant effluent flow of receiving stream.
    c. Designated use of receiving stream.

5.4.1 Capabilities

The Priority Program has the capability to sort hazard priority information by facility name and number, zip code, county, facility river basin, Standard Industrial Classification code, facility sanitary sewer, use score, total discharge score, surface water score, groundwater score, and sanitary sewer score, or combinations of the above.

5.4.2 Quality Control

The Priority Program has its own quality control program to detect erroneous or missing information in the various factors used in the ranking. The quality control program lists the facility number, the Critical Material report in question, the action taken by the program to compensate for the problem and a description of the error (Ex. 5-11).

Various alternative factors were programmed into the system to allow the priority ranking program to continue calculations when error or inadequate information exists. However, facilities that receive a score based on an alternative factor are marked on the printout.

5.4.3 Limitations

The Priority Program developed under TSCA did not fulfill original expections. Because background environmental data is very limited and existing discharge situations are extremely variable, the program is most useful when used as an administrative tool in prioritizing MDNR staff functions (i.e., NPDES permit issuance, follow-up investigations, biological surveys, etc). The emphasis placed on factors in the equations used in this program are currently very program specific for MDNR. Potential users of this program are strongly urged to evaluate the specific needs of their program and make revisions in the various aspects of this program to address those concerns.

NOTE: Close communication between user staff and data analysts is a vital link in information retrieval and operation of the computer programs.

Exhibit 5-11 Priority Program Error Detection

```
G/584/16-01                              MICHIGAN DEPARTMENT OF NATURAL RESOURCES                               PAGE    8
RUN DATE 06/04/81                            BUREAU OF ENVIRONMENT PROTECTION
                                           DATA AUDIT FOR REPORT REQUEST 503

              FAC NO          CM NUMBER          ACTION           REASON FOR CONCERN

              730077          CLASS019           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              730078          CLASS027           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              730082          CLASS015           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              730133          07782505           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              740115                             TYPE = 5         MISSING WASTEWATER RECORD
              750021                             TYPE = 5         MISSING WASTEWATER RECORD
              810013                             CONTINUED        2 OUTFALLS TYPE1-DIFFERENT DESIGN CODES
              810082                             TYPE = 5         MISSING WASTEWATER RECORD
              810113          CLASS027           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              810113          CLASS027           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              810126                             TYPE = 5         MISSING WASTEWATER RECORD
              810143          CLASS022           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              810148                             TYPE = 5         MISSING WASTEWATER RECORD
              820208          00100425           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820211          00100425           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820278          00134327           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820289          CLASS018           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820289          CLASS018           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820296                             CONTINUED        2 OUTFALLS TYPE1-DIFFERENT DESIGN CODES
              820306          CLASS079           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820312                             TYPE = 5         MISSING WASTEWATER RECORD
              820349          CLASS027           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820427          CLASS019           TYPE = 5         NO OUTFALL INFO FOR GPS NO 003
              820427          CLASS010           TYPE = 5         NO OUTFALL INFO FOR GPS NO 003
              820427          CLASS079           TYPE = 5         NO OUTFALL INFO FOR GPS NO 003
              820427          CLASS027           TYPE = 5         NO OUTFALL INFO FOR GPS NO 003
              820429                             TYPE = 5         MISSING WASTEWATER RECORD
              820442          CLASS017           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820474          CLASS015           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820509          CLASS015           DISCH = 0        OUTFALLS LISTED BUT NO DISCHARGE CODE
              820516                             TYPE = 5         MISSING WASTEWATER RECORD
              820577          CLASS027           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820578          00079016           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820599                             TYPE = 5         MISSING WASTEWATER RECORD
              820649          CLASS027           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820686                             TYPE = 5         MISSING WASTEWATER RECORD
              820700          CLASS018           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820704          07782505           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820704          07782505           CONTINUED.       DROUGHT FROM OF RECEIVING STREAM=0000000
              820734          CLASS022           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
              820781          CLASS027           CONTINUED        DROUGHT FROM OF RECEIVING STREAM=0000000
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Chapter 6

Use of Critical Materials Information

A variety of organizations and agencies have utilized the data base and related computer programs. Critical Materials information usage is divided into in-house uses of information, other state agencies, local government agencies, use by federal agencies, and other uses. Limitations of data use are also presented.

Chapter 6

Use of Critical Materials Information

The data base and related computer programs developed under the TSCA Cooperative Agreement are being utilized by a variety of organizations and agencies. The Wastewater/Critical Materials data has been used extensively by various divisions within MDNR utilizing various programming options. As knowledge of the system increases, use of the data is also increasing with other organizations outside of the department. Increased use of the data has also helped with compliance of Critical Materials reporting requirements by gaining information from users regarding discrepancies in the data base.

6.1 In-House Uses of Information

The information contained on the Wastewater/Critical Materials reports is utilized by five divisions within the MDNR. These divisions are responsible for administering programs that include environmental permit (i.e., water, air, solid waste) issuance, enforcement of permits and other environmental regulations, and evaluation of situations involving chemicals in the environment and their hazard potential.

In the area of environmental permit issuance, primary use of the Critical Materials data has been from staff involved in surface water pollution control activities. Staff reviews the information submitted by a company on annual Critical Materials reports to assure close correlation with the information supplied by the company on its application for a surface water discharge (NPDES) permit. Following comparison of the two reports, discrepancies in information are highlighted and discussed with the company prior to further permit processing. The data source (Critical Materials Report or NPDES permit application) containing the discrepancy is then amended to reflect the correct information.

Another use of the Critical Materials data in the surface water permit program is the priority ranking system which ranks facilities with surface water discharges based on a variety of factors (Chapter 5). Michigan had 383 facilities which reported having at least one surface water discharge on their Wastewater/Critical Materials report and therefore must have NPDES surface water discharge permits. Work has been on-going with the priority program, to coordinate items required in both the permit process and the Critical Materials Report. These items include volume and content of wastewater discharge, Critical Materials discharge amounts, destination of the discharge, and drought flow of the receiving surface water. Various prioritization schemes are being evaluated to determine if the items available on the Critical Materials Report can be ranked in an order to help prioritize facilities involved in the NPDES permit issuance process.

Staff also use Critical Materials information in the review of permit applications from municipal sanitary sewer systems. Municipalities are not required to submit a Wastewater/Critical Materials Report under Act 245. However, all companies that have a wastewater discharge to the municipal systems are required to report. Staff has used the data base for input on contributing industries of the municipal system in question, selecting by computer from the master program (Chapter 4), all those facilities that discharge to that system. The data base compilation of industries is then checked against the pretreatment survey submitted by the municipal system as part of its NPDES permit application. The statistical reports generated from the data base are also used by staff to estimate loadings of Critical Materials being discharged to the sewage treatment plant. This is then used as a tool in establishing permit limitations and monitoring requirements for the treatment plant. A priority program is also being evaluated for use in prioritizing the permit issuance process for municipal treatment plants. Michigan had 457 facilities reporting a discharge to a sanitary sewer system with 113 different sewer systems across the state named as discharge locations. This prioritization system would place emphasis on those treatment plants with a high number of facilities with chemical discharges or with high loadings of particularly hazardous chemicals.

Staff issuing groundwater and air use permits have used Critical Materials data base information on a limited basis. Structured consistent use of the system has not taken place on a routine basis. A priority scheme is also being developed for groundwater permits which would place appropriate emphasis on the factors used in issuing groundwater permits. There are 42 facilities listing a discharge to groundwater on the 1980 data base. This classification includes industries with a discharge of process or noncontact cooling wastewater directly to the surface of the ground, applied by spray irrigation techniques, discharged to a lagoon or seepage pond with no outlet, or to a septic tank/tile field.

Staff involved in the enforcement of the various environmental regulations, including Act 245 also use the data base. Due to the nature of most enforcement activities, use of the data base has been primarily of past reported records submitted by companies. Experience has proven that complete, clear data base records are extremely important in these situations. Future use of the system for enforcement activities will benefit by the quality control efforts exerted by staff during the cooperative agreement time span to increase the accuracy and completeness of the reports.

Another major use of the Wastewater/Critical Materials data base has been in the evaluation of situations where there has been or is potential environmental contamination by chemicals. MDNR staff spend a good deal of time on problem evaluation of this type, often coordinating efforts with other state agencies, local government units and private and public interest groups.

These problems are usually encountered by the MDNR and other groups in various fashions. They may be in the form of a specific chemical that is or may be a problem when used anywhere in the state, or a specific location where unknown chemicals may be contaminating the environment. Other situations have involved a particular type of industry which may be of concern, or a particular river basin where contamination is suspected. In these situations, the computer programs associated with the Wastewater/Critical Materials data base have been useful tools in selecting and sorting facility or chemical records which may be involved.

Selected examples of use of the data base for problem evaluation include:

1) A recent chemical problem in Michigan involved methylene bis 2-chloroaniline (MBOCA). This chemical has been assessed as a potential human carcinogen and has been on Michigan's Critical Materials Register since 1977. The problem involved MBOCA contamination of city streets, yards, gardens and homes in the vicinity of a small chemical company producing the substance. A combination of "track out" contamination during handling and disposal of the chemical by the company and the tendency of the chemical to strongly absorb to dust and soil particles influenced the widespread contamination. MBOCA enters the human body by skin adsorption and by inhalation of contaminated dust. Traces of MBOCA were found in the urine of some chemical company workers, and in some preschool children and adults working in industries adjacent to the chemical company (MDPH, 1980). Following evaluation of the chemical contamination in this community, concern developed for use of MBOCA at other Michigan facilities.

The Critical Materials data base was used to locate all facilities reporting MBOCA under Act 245. The list of facilities generated by the data base was then combined with lists compiled from other data sources. As of May, 1981, Michigan had 71 facilities that were suspected of having MBOCA at their facility location. Forty-nine of these facilities were investigated. The MBOCA question was resolved at 20 facilities. Twenty-nine facilities were found to require further actions to identify and evaluate their situations involving MBOCA (i.e., sampling, site clean-up, disposal location identification). Twenty-two sites still need to be investigated.

The Critical Materials data base will continue to be scanned for facilities reporting new uses of MBOCA in upcoming years.

2) A request was received from the Michigan Toxic Substances Control Commission concerning the Critical Materials known to be human positive, human suspect, or animal positive carcinogens and the amounts of each being used and/or discharged in Michigan. Through the use of the "C.M.R. - Statistical Report" and the "C.M.R. Hazard Assessment Report", TSCA-Cooperative Agreement personnel were able to supply the Commission with the information within forty-eight hours. Prior to the development of the two computer programs, the information would have taken weeks to manually tabulate.

3) The Critical Materials Data Base was utilized for a situation where environmental contamination was considered in a geographic location. Dog kennel owners in a southern Michigan county and their local veterinarians became concerned when two kennels in close proximity housing more than 70 dogs each, reported mottled teeth, reproductive problems (dying and deformed litters, low birth weights of pups), and bony growths in adult dogs. A third smaller

> kennel also reported bony growths. These common occurrences and concerns were brought to the attention of specialists at Michigan State University's (MSU) Veterinary Clinic. MDNR was asked to provide information on sources of air and water pollutants in the area, and to investigate the possibility of environmental contamination being responsible for the observed problems at kennels in the area. CMR listings showed several metal finishing industries in the area that used or discharged Critical Materials such as heavy metals (cadmium, lead, zinc, chromium) and solvents (tetrachloroethylene, trichloroethylene). Company location, discharge type, and current waste disposal methods (including haulers and processors) were checked for all industries listed on the CMR forms. Sources of Air Priority Chemicals were also compiled for investigations.
>
> Since both affected kennels use private wells as a water supply source, potential groundwater contamination sources were also investigated. Groundwater dischargers, landfills, and septic tank disposal sites in six area townships were located on topographical maps. One groundwater discharger discharged zinc, chromium, and cyanide to seepage lagoons. The company has a long record of inadequate waste disposal practices which resulted in the contamination of several private wells with chromium, and is currently in litigation. However, the company's location cast some doubt on it as a possible source of chemical contamination. There were several landfills near the kennels (three are within a mile of Kennel A on a downhill slope of 758 feet to 700 feet). All are closed, and were not being monitored. The county health department was checking their files to see if they have a record of how long the landfills were open, what industries used them, and whether toxic materials such as metal plating wastes, solvents, or paint solids were placed in the landfills. Lists of Critical Materials dischargers, landfills, and historical information on chemical use and disposal was shared with MSU and other agencies investigating the problem. To date, there is no indication that any of these industrial dischargers, or disposal situations are related to the toxicosis reported in the dogs.

Another in-house use of the data base was the production of a graphic display of facilities on a state wide basis which report Critical Materials use and/or discharge. Each facility was plotted on a map (U.S. Geological Surveys; scale 1:500,000) according to its location, use and/or type of Critical Materials discharged. The classification categories include:

1. Use only
2. Use and discharge to surface waters
3. Use and discharge to groundwaters

4. Use and discharge to municipal sanitary systems
5. Use and a combination of the above discharge routes

Other points of reference on the map include the locations of public water supplies from surface and groundwaters. Our office also received TSCA production data and maps from EPA-Region V. The maps are the same scale as the map described above. This allows for easy comparison of the data presented on each. The display can be used in presentations explaining the TSCA Cooperative Agreement program.

Statistical reports have been used for a variety of purposes in the department. Reports are currently being prepared for the department presenting compilations of Critical Materials use and discharge distribution data for assorted geographic locations (i.e., counties, river basins). amounts and frequency of Critical Materials reported used and discharged by various types of manufacturing industries in the state is also being compiled (i.e., chemical, pulp and paper, metal, paints and plastics, transportation, electrical services, and petroleum refineries). This will aid the department in evaluating heavy chemical use and discharge in geographic locations, waterways or industrial classifications.

Staff also provided Environmental Services administrative staff services with statistical reports on use/discharge and hazard assessment information on Critical Materials to be regulated under Michigan's Hazardous Waste Management Act (Act 64). This information was used to defend the proposed rules for Act 64 while they were being debated in the Michigan legislature.

6.2 Other State Agencies

The Public Health Department has compared their records on chemicals used in Michigan facilities compiled under occupational safety and health legislation against records of chemicals reported by facilities on the Wastewater/Critical Materials data base.

The Public Health Department has also used the system in problem evaluation when there is potential for environmental chemical contamination. This is a primary concern of the Health Department if public drinking supplies may be impacted or if chemicals may have an adverse effect on human health.

The Agriculture Department also uses the information for problem evaluation. The data base information can be useful when they have an agricultural situation which may be impacted by chemical contamination or a food industry where chemical misuse or handling could produce a problem.

Efforts to coordinate various aspects of information sharing, including that from the Critical Materials Program were initiated by the Departments of Natural Resources, Public Health and Agriculture. It was a concensus opinion, that toxic substances problems are not in most cases, selective for one environmental compartment, one affected plant or animal species or one state agency and its jurisdiction. Therefore, information available on toxic substances should be in a format that promotes use and exchange between the departments. Staff from the three departments worked on joint procedures for:

1. Information sharing and data system development and management,

2. Confidentiality of materials handling and maintenance, and

3. Hazard assessment of chemicals.

Points outlined in these procedures stressed consistent use of identification systems and terminology common and accepted by each department. Recommendations included using common chemical names, the Chemical Abstract Service chemical identification numbering system, facility identification by EPA I.D. (Dunn's) number, and geographic location descriptions by town, range and section numbers.

6.3 Local Government Agencies

Various units of local government in Michigan have used the Critical Materials information to supplement their existing data sources or as a framework to create a similar information data base. Requests for information have come from all forms of government including county and city administrations, county health departments, local government councils and community groups.

Surveys were sent to organizations who used the data base in the 1981 calendar year. They were asked questions on the usefulness, clarity, accuracy, and availability of the data (Ex. 6-1). The survey produced a variety of responses. Comments and suggested changes were also reviewed and evaluated for future changes to improve the data base and computer programs.

> City Administration - The information was requested for use as a guideline for establishing a "master plan" of contributing industries to the city sewer system, under the Industrial Pretreatment Program. The information was compared against information received from the city's industrial pretreatment survey. The city learned of the availability of the information through an MDNR basin engineer.

Exhibit 6-1 Wastewater Report/Critical Materials Data Base Questionnaire

The following questionnaire pertains to printout(s) you received with information on Michigan industries reporting critical materials and having a wastewater discharge. Please complete the questions and attach additional sheets if necessary.

A. Why was the information requested? (Please describe how it was used.)

B. What information was most helpful? Why?

C. Was the printout and coding sheet easily understood? If not, what was confusing?

D. Was the printout lacking any essential information regarding each facility?

E. How did you learn of the availability of this information?

Exhibit 6-1 (con't.)

F. What other kinds of programs would this information be useful for?

G. How can this information be made more readily available?

H. Did this information help to develop a more comprehensive local toxic substances monitoring program?

I. Please list factors of major concern in the control of toxic materials in your area. (Water, air and/or groundwater pollution, transportation, population density, etc.)

J. Additional Comments:

In this case, the city knew of industries not on the Critical Materials data base, who were reporting discharges of Critical Materials to the city. Compliance was pursued by TSCA staff in regards to these industries.

Council of Local Governments - The information was used to determine the number and types of business and industries located in a township in their jurisdiction, which use or produce Critical Materials. This information assisted the government council in conducting a groundwater protection project assessing the potential threats to groundwater in the township. The information will be considered in the development of local management options for groundwater protection. The council's staff learned of the availability of the information through MDNR Water Quality Division staff.

The council is also looking into other factors of concern in the control of toxic materials including emergency spill potential, industrial chemical storage methods, illegal disposal of wastes, and disposal of small amounts of toxic materials by homeowners.

County Health Department - The information was used to supplement a "Chemical Hazard Plan". The county is compiling a data bank of industries who use and/or dispose of hazardous chemicals in their county. They plan to plot industrial locations where certain chemicals are being utilized, for a better understanding of "heavy" use locations.

The information on the manufacturing classification, and the type and amount of chemicals used by the facilities was the most beneficial. The information alsohelped the county to develop a more comprehensive toxic substances monitoring program.

Other factors of interest to the county in regards to control of toxic substances,include groundwater pollution potential due to sandy soil types, combined sewer systems and potential for surface water pollution of recreational lakes in the county, and the present poor interaction between many agencies on local and state levels who might be involved in toxic materials concerns.

University Institute for Community Development cooperating with 16 Communities - Critical Materials data base information was used to supplement information from community officials to prepare a hazardous waste/materials management plan. The industries in the area will be contacted to obtain further information on their chemical use including emergency preparedness plans, transportation routes, on-site storage, etc. The information was beneficial to the Institute in identifying materials and volumes used by facilities.

The Institute also felt this information could be valuable in aiding communities in conducting vulnerability assessments of hazardous materials manufacture, use, storage and transport. Publicizing the availability of this information through the Michigan Municipal League, Michigan Townships Association and Michigan Association of Counties, as well as community and volunteer groups was suggested by the Institute, as a means of helping local governments in developing more comprehensive local toxic substances monitoring programs.

6.4 Use by Federal Agencies

Use of the Critical Materials information by federal agencies has not been as prevalent as use by state and local government agencies. Requests for information have been received from the U.S. Coast Guard Safety Office, U.S. EPA - Region V and the International Joint Commission to assist in defining, evaluating and solving problems relating to toxic substances.

Information on the hazard assessment program was also shared with EPA-Washington staff, Council of Environmental Quality staff and various consulting firms associated with the development of the Chemical Information System Network (CSIN), during a meeting in Washington, D.C. regarding CSIN script development and prototype user requirements.

6.5 Other Uses

Various state governments and the Canadian national and provincial governments have asked for information on the system, its design limitations, and use capabilities on a state-wide basis. Universities and colleges in and out of Michigan have also requested information on the program.

Other requests have come from private interest groups, consulting firms, attorneys, chemical companies and television and radio stations in the state. Most of these requests have been in response to a specific chemical problem in the state, or a problem where chemical contamination was suspected. Requests from private concerns were handled through Michigan's Freedom of Information Act.

6.6 Limitations

There are limitations to the use of a reporting system like the Wastewater/Critical Materials program. The legislative mandate, by which this program was created, requires only those businesses having a process or noncontact cooling wastewater discharge to waters of the state to report their Critical Materials use and discharge.

The data base which contains the Critical Materials information is only as comprehensive as its legislative mandate allows. This is a limitaton that must be realized in certain uses of the information, particularly when comprehensive industrial chemical use or disposal information is the primary interest, regardless of the wastewater reporting status. This data system does not contain information on those facilities that have dry processes, recirculating cooling water systems or have all wastewater hauled off-site. These industries and others exempt from the reporting requirements of Act 245, still may use and dispose of Critical Materials and other hazardous substances.

Chapter 7

Field Investigations

Investigations are conducted to verify Critical Materials information submitted, to evaluate potential for adverse effects associated with Critical Materials discharge, and to determine the extent of damage when degradation has been confirmed. The summary of field investigations is divided into single facilities discharging to a receiving water, multiple facilities discharging to a receiving water, and multiple facilities discharing to a receiving water via a municipal sewer system. Also presented is a study designed to evaluate levels of chemicals in various Michigan municipal sewage sludges and to follow up on reported or suspected organic compounds detected in a study conducted by Michigan State University.

Chapter 7

Field Investigations

Field investigations are conducted to: 1) Verify reported discharges of Critical Materials (contained in annual Wastewater Report Forms); 2) evaluate the potential for environmental degradation or adverse human health effects associated with Critical Materials discharges; and 3) determine the extent of environmental degradation when degradation has been confirmed. The types of situations investigated generally fall into one of three categories: 1) Single facilities discharging to a receiving water; 2) multiple facilities discharging to a receiving water; or 3) single or multiple facilities discharging to a municipal sewer system. A summary of the field investigation process is shown in Table 7.1.

7.1 Summary of Field Investigations

7.1.1 Single Facilities Discharging to a Receiving Water

Kewaunee Scientific Equipment Corporation, Plainwell, Michigan, a manufacturer of specialty metal furniture, was selected for a facility investigation due to its use of six heavy metals and the fact that its effluent is discharged to a seepage lagoon. The investigation consisted of an interview with the facility's chief engineer, a plant tour, effluent sampling, and sampling of the paint booth residue. Analytical results verified the discharge of chromium and zinc to a seepage lagoon. Other

Table 7.1 Field Investigation Format

PHASE I - Site Selection

A. Review of data contained in TSCA Cooperative Agreement computer programs - Master Program, Statistical Report, Hazard Assessment Report, and Facility Hazard Priority Report.

B. Review of Water Quality files, Point Source Studies industrial survey reports, Biology (WQD) field investigations, and Comprehensive Studies field investigations.

C. Contact appropriate WQD District Office for additional information.

D. Develop preliminary work plan.

PHASE II - Field Work

A. Industrial Survey(s):

1. Interview with facility personnel.
2. Site inspection/plant tour.
3. Effluent sampling:
    a. Analyze for specific Critical Materials known to be or suspected of being discharged.
    b. General scan for organics, when justified, to determine unknown organic discharges.

B. Environmental Sampling: Selected sampling stations located upstream and downstream of wastewater discharge(s) to determine presence of Critical Materials in the various environmental compartments.

1. Water column
2. Sediments
3. Fish tissue analysis when Critical Materials are identified which have a potential of bioaccumulating.
4. Analysis of benthic macroinvertebrate community structure (optional).
5. Terrestrial soils/biota (optional).

PHASE III - Final Report and Recommendations

A. Notify appropriate MDNR divisions and/or other state agencies of any identified environmental problem.

B. Recommendations (where appropriate).

C. Final Report

D. Feedback of information into Facility Hazard Priority Report.

metals that were reported discharged were below detectable levels in the discharge. Two Critical Materials with no reported discharge were found above detectable levels producing a discrepancy with filed reports. Another discrepancy discovered was an unreported outfall consisting of floor drains open to the ground below paint booths. Based on the results of the survey, it was recommended that waste disposal practices be reviewed and Kewaunee's groundwater permit application, submitted in 1976, be expedited to protect the groundwater.

A field investigation was conducted at Total Petroleum, Inc., Alma, Michigan. Total Petroleum produces gasoline, fuel oil, jet fuel, and residual fuels. They reported using thirteen (13) Critical Materials and discharging six (6) Critical Materials in 1979. The purpose of the investigation was to verify Critical Materials reporting (use and discharge) and to determine if the presence of Critical Materials in the receiving environment are or could be causing a problem. The survey included interviews with plant personnel, a plant tour, industrial effluent monitoring, sludge analysis, and environmental sampling of water and sediment in the receiving stream. Total Petroleum effluent is discharged into County Drain #52 (Horse Creek) which empties into the Pine River near St. Louis, Michigan. The survey confirmed the discharge of four materials reported by Total. However, the survey detected the presence of two materials in the discharge, PCBs and benzene, which the facility had reported as having no discharge. To assess the environmental impact of the discharge, segments of the stream receiving the effluent from Total and also bordering the land used by Total for sludge disposal were surveyed. Stations up and downstream of these two areas were sampled and analyzed for the Critical Materials reported by Total. PCBs (A-1260) were detected in the water column (0.41 ug/l) downstream from the discharge. The effluent from this outfall also contained PCBs (A-1260 at 0.87 ug/l = 1.6 kg/day). Sediment samples were also collected and demonstrated elevated levels of various heavy metals at stations downstream of the outfall and adjacent to the fields where sludge was disposed, as compared to upstream controls. Benzene and PCBs were detected in the effluent which is discharged to a deep well. Various recommendations made to the Department following completion of the survey emphasized the need to further evaluate the source of PCBs in the effluent and to determine if disposal practices presently used by Total for on-land sludge disposal is the cause of contaminated sediments in the adjacent stream.

An on-site field investigation was conducted at Nelson Chemical Company (a liquid waste disposal facility), Detroit, Michigan. Because of previous problems encountered at Nelson Chemical Company by the MDNR, it was suspected that this facility was discharging Critical Materials to the Detroit Municipal Wastewater Treatment System that were not reported in the 1978 Wastewater Report. The field investigation verified that there was a high probability of unreported discharges of Critical Materials. Subsequent file searches and correspondence with a number of waste generators serviced by Nelson Chemical Company showed that Nelson Chemical Company potentially discharged at least twenty-eight (28) Critical Materials in addition to the Critical Materials they reported. Administrative action was initiated to bring Nelson Chemical Company into compliance with Michigan Laws. Nelson Chemical Company responded to the administrative action by filing amended 1978 Wastewater Report Forms and filing accurate 1979 forms.

A survey was conducted at Ren Plastics, Ciba-Geigy Corp., Okemos, Michigan. Local residents had expressed concern over the use and discharge of Critical Materials at Ren Plastics. The results of the survey indicated that Ren Plastics was not discharging Critical Materials in its effluent at levels considered to be above ambient or expected values.

The U.S. EPA and MDNR (TSCA staff) conducted an extensive study of Dow Chemical Company-Midland plant during August 31, 1981 to September 28, 1981. The study consisted of a series of water samples taken at three Tittabawassee River locations, four Dow Chemical outfalls (effluent), Lake Huron water (Dow Intake), and Dow Corning effluent to the Dow Chemical tertiary treatment system. In addition, a 28-day fish bioaccumulation study was conducted in the Tittabawassee River. The objectives of the study were to determine the concentrations of organic and inorganic contaminants in Dow Chemical effluents and to what extent they may be bioaccumulating in fish in the Tittabawassee River. Results of the study are to be used in setting water quality-based effluent limitations in the Dow Chemical Company National Pollutant Discharge Elimination System permit (NPDES).

7.1.2 Multiple Facilities Discharging to a Receiving Water

A survey was conducted on a portion of Swan Creek in the vicinity of Bronson, Michigan. The purpose was to determine the possible impact that discharges of Critical Materials into County Drain No. 30 have on Swan Creek. County Drain No. 30 received known wastewater discharges containing formaldehyde, chromium, nickel, and zinc with possible discharges of PCB, trichloroethylene, copper, and styrene. The discharges originate from five industries and a municipal wastewater treatment plant located in Bronson. TSCA-Cooperative Agreement personnel coordinated the sampling efforts of the Point Source Studies Section, Comprehensive Studies Section, and Biology Section of the MDNR. Sampling included point source industrial and WWTP discharges, County Drain No. 30 water and sediment samples, and Swan Creek water and sediment samples above and below the confluence of County Drain No. 30. Effluent samples from Scott Fetzer, Douglas Division Plants #1 and #2 showed that trichloroethylene was being discharged by both plants and that PCB was being discharged by Plant #2. Both Scott Fetzer plants discharge into the Bronson storm sewer which empties into County Drain #30. Trichloroethylene was present in quantifiable concentrations at the point of discharge of the storm sewer into County Drain No. 30 and downstream in County Drain No. 30 at a point just above the confluence of the County Drain with Swan Creek. PCB concentrations were less than detectable at the storm sewer discharge point and were not sampled in water samples from County Drain No. 30. However, PCBs were present in the sediments of County Drain No. 30 in the 10 to 16 ppm range. Staff recommended that follow-up sampling of resident fish populations be conducted in Swan Creek for possible PCB contamination, and that additional sampling be conducted in Swan Creek to evaluate the impact elevated levels of heavy metals and PCBs in County Drain No. 30 sediments are having on Swan Creek. The report was forwarded to the appropriate MDNR Divisions for follow-up investigations. Follow-up investigations assessed levels of PCB and heavy metals in sediments of Drain No. 30 and Swan Creek, and levels of PCB in fish species of Swan Creek. The results of these assessments are summarized below.

1. Sediments in Drain No. 30 (downstream of all dischargers) and Swan Creek (downstream of the confluence) are heavily polluted with cadmium, chromium, copper, lead, nickel and zinc.
2. PCB (as Aroclor 1254) concentrations in Drain No. 30 sediments equaled 32.0 mg/kg dry weight. Based on U.S. EPA guidelines, they are considered heavily polluted since they exceed 10.0 mg/kg.
3. Swan Creek sediment PCB concentrations ranged from less than 0.2 mg/kg dry weight at the background station (120079), to 7.5 mg/kg just below the confluence of Drain No. 30 and finally 1.6 mg/kg at Burr Oak Road and Sackett Road, located 0.35 and 1.57 miles downstream from the Drian No. 30 confluence, respectively.
4. Total PCB (as Aroclor 1254) concentrations in fish samples from the three survey stations did not exceed the U.S. Food and Drug Administration's action level of 5.0 mg/kg wet weight.

A recommendation was made to locate and eliminate the source of PCBs to Drain No. 30 and enforce compliance of recently recommended water quality-based effluent limits for all dischargers to Drain No. 30.

7.1.3 Multiple Facilities Discharging to a Receiving Water via a Municipal Sewer System

A survey was conducted on the Zeeland Wastewater Treatment Plant and its associated dischargers. The Zeeland site was chosen as a representative municipal facility because it is a relatively small municipality while still having a wide variety of industrial dischargers. The industries include a chemical manufacturing company, a foundry, and assorted wood, plastics, and metals assembly facilities. The North Branch of the Macatawa River (receives discharge of Zeeland WWTP), the Macatawa River, and various locations on county drains discharging into the North Branch Macatawa River were also sampled (water column and sediments). In-house file searches were conducted on the facilities identified by the "CMR - Master Program" computer program as dischargers to the Zeeland system. A preliminary survey was conducted by TSCA Cooperative Agreement staff to determine the magnitude of the survey and confirm information regarding Critical Materials use and discharge reported by Zeeland industries in their 1979 Wastewater Report Forms. After consultation with the Zeeland WWTP superintendent, it was determined that additional facilities (not listed in our program) which may be using and/or discharging Critical Materials were also contributors to the Zeeland system. Where appropriate, these "new" facilities were included in the preliminary and final surveys. The final survey consisted of four complete industrial surveys, grab samples from four additional facilities, ten sample locations at various points along the sewer system, and the samples from the county drains, North Branch Macatawa River, and Macatawa River sites. A brief summary of the report shows that many of the facilities included in the study were in noncompliance with Act 245, as amended by Act 293. The noncompliance included: 1) facilities which discharged wastewater, but did not file annual Wastewater Report Forms; 2) facilities using Critical Materials but not reporting their use; and 3) facilities discharging Critical Materials but not reporting their discharge. Actions were taken to correct this situation. Analyses of water samples revealed sixteen (16) Critical Materials were present in the industrial discharges or sewer system, seven (7) of which were present in quantifiable concentrations in the Zeeland WWTP influent. Two of these, zinc and di-ethylhexyl phthalate, were detected in the WWTP discharge to the North Branch of the Macatawa River.

An on-site survey was conducted at the Tecumseh Wastewater Treatment Plant and its contributing industrial facilities. The survey included interviews with officials from the facilities in the system; effluent sampling at the WWTP and the major industrial facilities; sampling of the sewer system at selected points; and sampling points in the North Branch of the River Raisin above and below the Tecumseh WWTP discharge. The following points were noted as a result of the survey:

1. Tecumseh Products was discharging Critical Materials in quantities that would greatly exceed the reported discharge. In addition, unreported discharges of cadmium were found in their discharges.

2. Faraday, Inc. was discharging cadmium in quantities that would exceed their reported discharge by two orders of magnitude.

3. High concentrations of total aromatic amines (as aniline) were found in the sewer system and the Tecumseh WWTP influent. However, the concentrations were below detection limits in the WWTP effluent.

4. The Tecumseh WWTP sludge (which is land applied) had high levels of metals and could potentially contain aromatic amines and chlorinated phenols.

A WWTP/contributing facilities study was conducted at the Whitehall/Montague WWTP system. This system uses a land application treatment process. After primary settling and aeration/retention, the wastewater is spray irrigated on agricultural fields (corn) where it percolates through the soil and is pumped via purge wells and discharged to the White River. The major industrial contributors are a leather tanning facility, a specialty chemical company, and a manufacturing complex (two sites) producing aviation parts. Effluent samples were taken at industrial facilities, various locations in the sewer system, and the WWTP. The WWTP plant sampling included the influent, the discharge to the retention pond, the retention pond, the agricultural field purge wells, and the combined purge well discharge to the White River. Environmental samples (water and sediment) were taken from the White River and Silver Creek, a tributary to the White River and adjacent to the WWTP. A brief summary of the report indicated:

1. Facility compliance with Critical Materials Reporting was relatively good. Minor compliance issues included the detection of various metals at low levels in some facility discharges.
2. Critical Materials discharges to the Whitehall-Montague wastewater treatment plant did not appear to produce a significant impact on surface water or sediments in the area of the discharge. Groundwater impact could not be evaluated due survey limitations.

An example of a full report including data, engineering report, toxicity evaluation report, and final report is presented in Appendix E.

7.1.4 Municipal Sewage System Sludge Evaluation

A study was designed to evaluate the chemical constituent levels in various municipal sewage sludges across the State, and to follow up on reported or suspected organic compounds detected in Michigan municipal sewage sludge, in a study conducted by Michigan State University (MSU). The MSU study analyzed single grab samples from 203 publicly owned treatment works (POTWs) for 23 elements and 80 organic chemicals.

Under the study conducted by MDNR, 23 POTWs were selected for sludge evaluation. These plants were selected based on a number of variables including high sample constituent levels found in the MSU study, background characteristics, type of sludge treatment, sludge land application practices, and high potential for chemical discharges by contributing industries. The samples collected will be analyzed for chlorinated hydrocarbons, chlorinated phenols, phthalate esters, purgeable halocarbons, PCB's, arsenic and mercury.

This study was also coordinated with a study currently being conducted by the Michigan Department of Agriculture on uptake of chemicals in crops and soil following land application of sludge.

The study protocol in addition to selecting the POTWs to be involved in the study, included discussions with the authors of the MSU study, interviews with the selected POTW staff involved in the MDNR study and the actual sample collection and analysis.

Department staff from the Environmental laboratory, Point Source Studies and Office of Toxic Materials Control met with MSU staff to discuss sample preservation, handling, extraction procedures, and analytical techniques, and other variables which could contribute to varying constituent levels. Interviews with POTW staff conducted by Point Source Studies and Toxic Material Control staff covered "POTW Specific" sample collection procedures, sample collection devices, potential sample contamination by rubber or plastic pipes or collection devices, operation of the plants sludge treatment process and methods of collecting representative sludge samples. Staff from each POTW's industrial pretreatment program were consulted on industrial contributors to the system, their chemical discharges and operating schedules each POTW was provided with a complete Wastewater/Critical Materials Report for industries contributing to their system. The validation and completness of the Critical Materials reports was also discussed.

Sample collection procedures at each POTW were designed to collect the most representive sample of sludge. This included these basic sampling procedures. The first were grab samples from a well mixed digester with at least a 10-day holding time. The second involved samples composited three times daily over a seven day period and the third (a variation of the second procedure) included daily compositing and analysis of those samples, as well as analysis of a daily composite over a seven day period. The third procedure was utilized at only two of the 23 POTW's selected.

Each plant will contribute two sets of samples collected by one of the procedures above, with sample sets being separated by approximately four weeks.

At the time of this writing, the first round of samples has been collected and is in process of analysis. The second round of sampling is currently under way.

The results of this study will be published under separate cover.

Chapter 8

Recommendations

This chapter contains a list of general recommendations to assist stateagencies and other organizationsin establishing a chemical inventory and reporting system like Michigan Critical Materials Reporting Program.

Chapter 8

Recommendations

Michigan has been fortunate in being able to pursue development of a chemical inventory system with the assistance of a cooperative agreement provided by U.S. EPA. This publication has been one of the products of the cooperative agreement. It outlines steps necessary to develop and maintain a program such as Michigan's. In addition to the technical aspects discussed in the preceding chapters, some recommendations have been formulated by staff based on experience gained during program development. These recommendations, in combination with the technical discussions, will assist state agencies and other organizations in adapting our program to best fit their organizational structure and program needs. Thoughtful planning will result in a program that can be a very useful tool in administering environmental programs.

Recommendation 1 - Establish long range goals, objectives and commitments for the program. Time frames for chemical inventory reporting of the type discussed in our publication are based on annual reporting requirements. Alternations in the methods or type of data collected can only be attempted on an annual basis. Careful planning and communication maintained throughout the program and long range goals, objectives, and commitments will build a quality data base.

Recommendation 2 - Maintain a dynamic computer system, by continually seeking alterations in system design that will produce data retrieval processes that keep consistent with other organizational program changes. If the system is allowed to change with the user's needs, the users will be able to assist in data verification and compliance more effectively.

This program and accompanying computer system provides a good base for the chemical inventory and reporting process. However, its various system components have ample room for expansion to deal with other aspects of chemical use and discharge by industries, including discharge permit requirements and limitations, enforcement actions and hazardous waste management activities.

Recommendation 3 - Assign responsibility of the program's maintenance, updates and alterations to one group. Success in administering this program requires total control of all aspects of the reporting and inventory process, including mailing list updates, facility report compliance, and additions, deletions and corrections to the data. Once the data is collected and verified, it can be placed in the system and made available to all staff that utilize the various retrieval options available.

Recommendation 4 - Make the data on the computer system available to field staff involved in direct contact with reporting facilities. Inform field staff of all data available, the computer system's retrieval options and the best ways to organize the data to fit their needs. Demonstrate uses of the data for problem solving (i.e. contaminated groundwater, unknown surface water discharges, municipal system contributors), permit compliance and other program applications. By making the field staff aware of the data and encouraging the use of the computer retrieval options, the quality of the data and system options will improve as a result of staff participation in data verification and compliance.

Recommendation 5 - Make administrative staff and management aware of the program, its various data options and data availability. Statistical summaries of chemicals used, discharged and disposed of can be used in administrative planning functions. Information organized by geographic boundaries can be used in problem solving, predicting and protecting transportation routes and logistics planning for spill and emergency response. Identification of the types of chemicals reported by certain industrial classifications can influence permit functions, staffing levels, and training needed in certain areas of expertise to deal effectively with these industries. Knoweldge on the volumes of chemicals reported on the inventory can be used to focus chemical evaluations, control efforts, and toxicological testing efforts.

Recommendation 6 - Establish clear guidelines for receiving, handling and storing confidential information. This should be in accordance with specifications in legislation authorizing collection of the data as well as public information disclosure. These procedures should include documentation on data handling, storage and access by data processing personnel and authorized use and dissemination of confidential information. All computer display formats should be designed to abide by these guidelines.

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APPENDIX A

Act 245, P.A. 1929

DEPARTMENT OF NATURAL RESOURCES

WATER RESOURCES COMMISSION

Act 245, 1929, p. 597; Eff. Aug. 28

AN ACT to create a water resources commission to protect and conserve the water resources of the state, to have control over the pollution of any waters of the state and the Great Lakes, to have control over the alteration of the watercourses and the flood plains of all rivers and streams, with powers to make rules and regulations governing the same, and to prescribe the powers and duties of such commission; to require the registration of manufacturing products, production materials and waste products where certain wastes are discharged; to provide for surveillance fees upon discharges to the waters of the state in order to provide for investigation, monitoring and surveillance necessary to prevent and abate water pollution; to prohibit the pollution of any waters of the state and the Great Lakes; and to prohibit the obstruction of the floodways of the rivers and streams of the state; to designate the commission as the state agency to cooperate and negotiate with other governments and agencies in matters concerning the water resources of the state; and to provide penalties for the violation of this act. Am. 1949, p. 120, Act 117, Imd. Eff. May 17;—Am. 1968, p. 256, Act 167, Imd. Eff. June 17;—Am. 1970, p. 572, Act 200, Eff. Apr. 1, 1971;—Am. 1972, p. 896, Act 293, Eff. Apr. 15, 1973.

The People of the State of Michigan enact:

323.1 Water resources commission; creation; members; appointment; qualifications; vacancies; compensation; office facilities; representatives of state officers.

Sec. 1. For the purpose of carrying out this act a water resources commission, hereinafter referred to as the commission, is created which shall consist of the director of the department of natural resources, the director of the department of public health, the director of the department of state highways, the director of the department of agriculture, and 3 citizens of the state to be appointed by the governor, by and with the advice and consent of the senate, 1 from groups representative of industrial management, 1 from groups representative of municipalities, and 1 from groups representative of conservation associations or interests, for terms of 3 years each. Vacancies shall be filled for the unexpired term in the same manner as original appointments. Members of the commission shall be entitled to actual and necessary expenses incurred in the performance of official duties. The department of administration shall provide suitable office facilities for the use of the commission.

Each of the state officers may designate a representative from his department to serve in his stead as a member of the commission for 1 or more meetings.

HISTORY: CL 1929, 278;—Am. 1941, p. 172, Act 131, Eff. Jan. 10, 1942;—Am. 1947, p. 316, Act 216, Eff. Oct. 11;—CL 1948, 323.1;—Am. 1949, p. 120, Act 117, Imd. Eff. May 17;—Am. 1963, p. 228, Act 165, Eff. Sept. 6;—Am. 1972, p. 897, Act 293, Eff. Apr. 15, 1973.

323.2 Organization, powers, and duties of commission; rules.

Sec. 2. The commission shall organize and make its own rules and procedure and shall meet at least once each month and shall keep a record of its proceedings. The commission shall protect and conserve the water resources of the state and shall have control of the pollution of surface or underground waters of the state and the Great Lakes, which are or may be affected by waste disposal of municipalities, industries, public or private corporations, individuals, partnership associations, or any other entity. The commission may make or cause to be made surveys, studies and investigations of the uses of waters of the state, both surface and underground, and cooperate with other governments, governmental units and agencies thereof in making such surveys, studies and investigations. The commission shall assist in an advisory capacity any flood control district which may be authorized by the legislature. The commission in the public interest shall appear and present evidence, reports and other testimony during the hearings involving the creation and organization of flood control districts. The commission shall advise and consult with the legislature on the obligation of the state to participate in the costs of construction and maintenance as provided for in the official plans of any flood control district or intercounty drainage district. The commission shall enforce this act and shall promulgate such rules as may be deemed necessary to carry out this act in accordance with and subject to Act No. 306 of the Public Acts of 1969, as amended, being sections 24.201 to 24.315 of the Compiled Laws of 1948.

HISTORY: CL 1929, 279; —CL 1948, 323.2;—Am. 1949, p. 120, Act 117, Imd. Eff. May 17;—Am. 1972, p. 897, Act 293, Eff. Apr. 15, 1973.

323.2a Cooperation and negotiation with other governments as to water resources; alteration of watercourses; federal assistance; report; requests for appropriations; recommendations.

Sec. 2a. (1) The water resources commission is designated the state agency to cooperate and negotiate with other governments, governmental units and agencies thereof in matters concerning the water resources of the state, including but not limited to flood control, beach erosion control and water quality control planning, development and management. The commission shall have control over the alterations of natural or present watercourses of all rivers and streams in the state to assure that the channels and the portions of the flood plains that are the floodways are not inhabited and are kept free and clear of interference or obstruction which will cause any undue restriction of the capacity of the floodway. The commission may take such steps as may be necessary to take advantage of any act of congress heretofore or hereafter enacted which may be of assistance in carrying out the purposes of this act including the water resources planning act, P.L. 89-80, as amended, and the federal water pollution control act, as amended.

(2) The commission shall report to the governor and to the legislature at least once in each year any plans or projects being carried on or considered and shall include in such report requests for any legislation needed to carry out any proposed projects or agreements made necessary thereby, together with any requests for appropriations. The commission may make recommendations to the governor on the designation of areawide water quality planning regions and organizations relative to the governor's responsibilities under the federal water pollution control act.

HISTORY: Add. 1949, p. 121, Act 117, Imd. Eff. May 17;—Am. 1968, p. 256, Act 197, Imd. Eff. June 17;—Am. 1972, p. 897, Act 293, Eff. Apr. 15, 1973.

323.3 Water resources commission; enforcement of laws; suits.

Sec. 3. The commission shall be authorized to bring any appropriate action in the name of the people of the state of Michigan, either at law or in chancery as may be necessary to carry out the provisions of this act, and to enforce any and all laws relating to the pollution of the waters and the obstruction of the floodways of the rivers and streams of this state. Whenever the attorney general deems it necessary, he shall take charge of and prosecute all criminal cases arising under the provisions of this act.

HISTORY: CL 1929, 280;—CL 1948, 323.3;—Am. 1965, p. 615, Act 328, Eff. Mar. 31, 1966;—Am. 1965, p. 823, Act 405, Imd. Eff. Oct. 29; —Am. 1968, p. 256, Act 167, Imd. Eff. Jun. 17.

323.4 Water resources commission; right of entry; assistance.

Sec. 4. The commission or any agent duly appointed by it shall have the right to enter at all reasonable times in or upon any private or public property for the purpose of inspecting and investigating conditions relating to the pollution of any waters and the obstruction of the floodways of the rivers and streams of this state. The commission shall have the right to call upon any officer, board, department, school, university, or other state institution and the officers or employees thereof for any assistance deemed necessary to the carrying out of this act.

HISTORY: CL 1929, 281;—CL 1948, 323.4;—Am. 1968, p. 257, Act 167, Imd. Eff. Jun. 17.

323.5 Establishment of pollution standards; permits; determination of volume of water and high and low water marks; rules; orders; pollution prevention.

Sec. 5. The commission shall establish such pollution standards for lakes, rivers, streams and other waters of the state in relation to the public use to which they are or may be put, as it shall deem necessary. It shall issue permits which will assure compliance with state standards to regulate municipal, industrial and commercial discharges or storage of any substance which may affect the quality of the waters of the state. It may set permit restrictions which will assure compliance with applicable federal law and regulations. It may ascertain and determine for record and in making its order what volume of water actually flows in all streams, and the high and low water marks of lakes and other waters of the state, affected by the waste disposal or pollution of municipalities, industries, public and private corporations, individuals, partnership associations or any other entity. It may make rules and orders restricting the polluting content of any waste material or polluting substance discharged or sought to be discharged into any lake, river, stream or other waters of the state. It shall take all appropriate steps to prevent any pollution which is deemed by the commission to be unreasonable and against public interest in view of the existing conditions in any lake, river, stream or other waters of the state.

HISTORY: CL 1929, 282;—CL 1948, 323.5;—Am. 1972, p. 898, Act 293, Eff. Apr. 15, 1973.

323.5a Water resources commission; regulations as to harmful interference with streams; records.

Sec. 5a. The commission shall have the authority to make regulations and orders for the prevention of harmful interference with the discharge and stage characteristics of streams. It shall have the authority to ascertain and determine for record and in making its order the location and extent of flood plains, stream beds and channels and the discharge and stage characteristics of streams at various times and circumstances.

HISTORY: Add. 1968, p. 257, Act 167, Imd. Eff. June 17.

323.5b Unlawful occupation, filling, or grading of flood plains, stream bed, or channel of stream; exceptions.

Sec. 5b. A person shall not occupy or permit the occupation for residential, commercial or industrial purposes of lands or to fill or grade or permit the filling or grading for any purposes other than agricultural, of lands in the flood plains, stream bed or channel of any stream, as ascertained and determined for record by the commission, or to undertake or engage in any activity on or with respect to the lands which is determined by the commission to harmfully interfere with the discharge or stage characteristics of a stream, unless the occupation, filling, grading or other activity is permitted by an order or rule of the commission or by a valid permit issued therefor by the department of natural resources under the provisions of law.

HISTORY: Add. 1968, p. 257, Act 167, Imd. Eff. June 17;—Am. 1972, p. 898, Act 293, Eff. Apr. 15, 1973.

323.6 Unlawful discharge into state waters.

Sec. 6. (a) It shall be unlawful for any persons directly or indirectly to discharge into the waters of the state any substance which is or may become injurious to the public health, safety or welfare; or which is or may become injurious to domestic, commercial, industrial, agricultural, recreational, or other uses which are being or may be made of such waters; or which is or may become injurious to the value or utility of riparian lands; or which is or may become injurious to livestock, wild animals, birds, fish, aquatic life, or plants or the growth or propagation thereof be prevented or injuriously affected; or whereby the value of fish and game is or may be destroyed or impaired.

(b) The discharge of any raw sewage of human origin, directly or indirectly into any of the waters of the state shall be considered prima facie evidence of a violation of this section by the municipality in which the discharge originated unless the discharge shall have been permitted by an order or rule of the commission. If the discharge is not the subject of a valid permit issued by the commission, a municipality responsible for the discharge shall be subject only to the remedies provided in section 7. If the discharge is the subject of a valid permit issued by the commission pursuant to section 7, and is in violation thereof, a municipality responsible for the discharge shall be subject to the penalties prescribed in section 10.

(c) A violation of a provision of this section shall be prima facie evidence of the existence of a public nuisance and in addition to the remedies provided for in this act may be abated according to law in an action brought by the attorney general in a court of competent jurisdiction.

HISTORY: CL 1929, 283;—CL 1948, 323.6;—Am. 1949, p. 121, Act 117, Imd. Eff. May 17;—Am. 1965, p. 615, Act 328, Eff. Mar. 31, 1966;—Am. 1965, p. 823, Act 405, Imd. Eff. Oct. 29;—Am. 1970, p. 572, Act 200, Eff. Apr. 1, 1971;—Am. 1973, p. 16, Act 3, Imd. Eff. Mar. 16.

323.6a Waste treatment facilities of industrial or commercial entity; examination and certification of supervisory personnel; reports; false statement; applicability of section.

Sec. 6a. Every industrial or commercial entity which discharges liquid wastes into any surface or ground waters or underground or on the ground other than through a public sanitary sewer shall have waste treatment or control facilities under the specific supervision and control of persons who have been certified by the commission as properly qualified to operate the facilities. The commission shall examine all supervisory personnel having supervision and control of the facilities and certify the persons properly qualified to operate or supervise the facilities. Such a certified person shall file monthly, or at such longer intervals as the commission may designate, on forms provided by the commission, reports showing the effectiveness of the treatment or control facility operation and the quantity and quality of liquid wastes so discharged. A person who knowingly makes a false statement in such report may have his certificate as an approved treatment facility operator revoked. This section shall not apply to water, gas or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil or gas production and disposed of in a well, if the well is used either to facilitate production or for disposal purposes and is under permit by the state supervisor of wells.

HISTORY: Add. 1968, p. 306, Act 209, Imd. Eff. June 24;—Am. 1972, p. 215, Act 129, Imd. Eff. May 4.

323.6b Discharge of waste water; contents and use of annual report; injunction; rules.

Sec. 6b. Every person, doing business within this state discharging waste water to the waters of the state or to any sewer system, which contains wastes in addition to sanitary sewage shall file annually reports on forms provided by the commission setting forth the nature of the enterprise, indicating the quantities of materials used in and incidental to its manufacturing processes and including by-products and waste products, which appear on a register of critical materials as compiled by the commission with the advice of an advisory committee of environmental specialists designated by the commission and the estimated annual total number of gallons of waste water including but not limited to process and cooling water to be discharged to the waters of the state or to any sewer system. The information shall be used by the commission only for purposes of water pollution control. The commission shall provide proper and adequate facilities and procedures to safeguard the confidentiality of manufacturing proprietary processes except that confidentiality shall not extend to waste products discharged to the waters of the state. Operations of a business or industry which violate this section may be enjoined on petition of the water resources commission to a court of proper jurisdiction. The commission shall promulgate rules as it deems necessary to effectuate the administration of this section, including where necessary to meet special circumstances, reporting more frequently than annually.

HISTORY: Add. 1970, p. 573, Act 200, Eff. Apr. 1, 1971;—Am. 1972, p. 899, Act 293, Eff. Apr. 15, 1973.

323.7 Permit to discharge waste into state waters; notice of determination; hearing; pleadings; disposition of case.

Sec. 7. (1) After April 15, 1973, a person shall not discharge any waste or waste effluent into the waters of this state unless he is in possession of a valid permit therefor from the commission. Compliance with the terms of an outstanding order of determination or final order of determination or stipulation with the commission that is in effect on April 15, 1973, shall be deemed to meet the requirements of this section until the commission issues its permit. The commission shall condition the continued validity of a permit upon the permittee's accomplishment of such effluent requirements as the commission deems necessary to prevent unlawful pollution by such dates as the commission deems to be reasonable and necessary and to assure compliance with applicable federal law and regulations. If the commission finds that the terms of a permit have been, are being, or may be violated, it may revoke the permit or grant the permittee a reasonable period of time in which to comply with the permit. The commission shall reissue a revoked permit upon a showing satisfactory to the commission that the permittee has corrected the violation by providing the necessary collection or treatment facilities and has adequately arranged for their operation.

(2) Whenever in the opinion of the commission a person is causing or is about to cause unlawful pollution of the waters of this state, the commission may notify the alleged offender of its determination. The notice shall contain, in addition to a statement of the specific violation which the commission believes to exist, a proposed permit or other action which it deems appropriate to assure timely correction of the problem and shall set a date for a hearing on the facts and proposed action involved, the hearing to be scheduled not less than 4 weeks nor more than 8 weeks from the date of the notice of determination. Extensions of the date of hearing may be granted by the commission or on request. At the hearing, any interested party may appear, present witnesses, and submit evidence. A person who has been served with a notice of determination may file a written answer thereto before the date set for hearing or at the hearing may appear and present oral or written testimony and evidence on the charges and proposed requirements for abatement of pollution contained therein. If a person served with the notice of determination agrees with the terms of the proposed permit and period of time for abatement of pollution which the commission deems necessary and notifies the commission thereof before the date set for hearing, disposition of the case may be made with the approval of the commission by issuance of a permit without further hearing. The permit approved and issued by the commission following the hearing as authorized by this section shall be conclusive, unless reviewed in accordance with Act No. 306 of the Public Acts of 1969, as amended, in the circuit court for the county of Ingham, for the county in which the person resides or for the county in which the violation occurred, upon petition therefor filed within 15 days after issuance of the permit to the person.

HISTORY: CL 1929, 284;—CL 1948, 323.7;—Am. 1949, p. 121, Act 117, Imd. Eff. May 17;—Am. 1965, p. 616, Act 328, Eff. Mar. 31, 1966;—Am. 1965, p. 523, Act 405, Imd. Eff. Oct. 29;—Am. 1970, p. 573, Act 200, Eff. Apr. 1, 1971;—Am. 1972, p. 699, Act 293, Eff. Apr. 15, 1973;—Am. 1973, p. 16, Act 3, Imd. Eff. Mar. 16.

323.8 Hearings; petition; review; water, sewage, waste, new or increased use; permit.

Sec. 8. (a) Whenever any person shall feel himself aggrieved by the restriction of polluting content, waste or pollution, or any other order or permit of the commission, or any stipulation or consent order executed pursuant to section 7, he may file a sworn petition with the commission, setting forth the grounds and reasons for his complaint and asking for a hearing of the matter involved. The commission shall thereupon fix the time and place for the hearing and notify the petitioner thereof. At the hearing the petitioner and any other interested party may appear, present witnesses and submit evidence. Following the hearing, the final order of determination or permit of the commission upon such matter shall be conclusive unless reviewed in accordance with Act No. 306 of the Public Acts of 1969, as amended, in the circuit court for the county of Ingham, for the county in which the person resides or for the county in which the alleged violation occurred.

(b) A person who is using the waters of the state for sewage or other waste disposal purposes or who requires a new or substantial increase over and above the present use now made of the waters of the state for sewage or other waste disposal purposes shall file with the commission a written statement setting forth the nature of the enterprise or development contemplated, the amount of water required to be used, its source, the proposed point of discharge of the wastes into the waters of the state, the estimated amount so to be discharged and a fair statement setting forth the expected bacterial, physical, chemical and other known characteristics of the wastes. Within 60 days of receipt of the statement, the commission shall issue a permit stating such restrictions as in the judgment of the commission may be necessary to guard adequately against such unlawful uses of the waters of the state as are set forth in section 6. The commission may deny a proposed new use in lieu of issuing a permit upon determining that unlawful pollution cannot be guarded adequately against by available waste treatment or control measures. If the permit or denial is not acceptable to the user, he may request a hearing on the matter involved, following which the commission's final order of determination, permit or denial in this connection shall be conclusive unless reviewed in accordance with Act No. 306 of the Public Acts of 1969, as amended, in the circuit court for the county of Ingham, for the county in which the user resides or for the county in which the use is contemplated, upon petition therefor filed within 15 days after service upon the user of the final order of determination, permit or the denial thereof.

HISTORY: CL 1929, 285;—CL 1948, 323.8;—Am. 1949, p. 122, Act 117, Imd. Eff. May 17;—Am. 1965, p. 616, Act 328, Eff. Mar. 31, 1966;—Am. 1965, p. 824, Act 405, Imd. Eff. Oct. 29;—Am. 1970, p. 573, Act 200, Eff. Apr. 1, 1971;—Am. 1972, p. 193, Act 118, Imd. Eff. Apr. 18;—Am. 1972, p. 900, Act 293, Eff. Apr. 15, 1973.

COMPILER'S NOTE: For provisions of P.A. 1969, No. 306, referred to in subsection (a), see §§ 24.201 et seq.

323.9 Violation of act; criminal complaint, penalty.

Sec. 9. Any duly appointed agent of the commission shall have authority to enforce the provisions of this act and may make criminal complaint against any person violating the same. After service of a written notice of determination, setting forth specifically any violation of this act, any person who shall fail to comply with the order of the commission shall be subject to the penalties of this act.

HISTORY: CL 1929, 286;—CL 1948, 323.9;—Am. 1949, p. 122, Act 117, Imd. Eff. May 17;—Am. 1965, p. 617, Act 328, Eff. Mar. 31, 1966;—Am. 1965, p. 824, Act 405, Imd. Eff. Oct. 29.

323.10 Violations; civil action by attorney general; venue; jurisdiction; penalty.

Sec. 10. (1) The commission may request the attorney general to commence a civil action for appropriate relief, including a permanent or temporary injunction, for a violation of this act or rules promulgated hereunder. An action under this subsection may be brought in the circuit court for the county of Ingham or for the county in which the defendant is located, resides, or is doing business. The court has jurisdiction to restrain the violation and to require compliance. In addition to any other relief granted under this subsection, the court may impose a civil penalty of not more than $10,000.00 per day of violation.

(2) A person who discharges a substance into the waters of the state contrary to the provisions of this act, or contrary to the provisions of a permit, order, rule, or stipulation of the commission, or who makes a false statement, representation, or certification in an application for, or form pertaining to a permit, or in a notice or report required by the terms and conditions of an issued permit, or who renders inaccurate a monitoring device or record required to be maintained by the commission, is guilty of a misdemeanor and shall be fined not less than $2,500.00 nor more than $25,000.00 for each violation. The court may impose an additional fine of not more than $25,000.00 for each day during which the unlawful discharge occurred. If the conviction is for a violation committed after a first conviction of the person under this subsection, the court may impose a fine of not more than $50,000.00 per day of violation. The circuit court for the county in which the violation occurred has exclusive jurisdiction. However, the person shall not be subject to the penalties of this subsection if the discharge of

the effluent is in conformance with and obedient to a rule, order, or permit of the commission. In addition to a fine, the attorney general may file a suit in a court of competent jurisdiction to recover the full value of the injuries done to the natural resources of the state and the costs of surveillance and enforcement by the state resulting from the violation. In addition to a fine, the court in its discretion may impose probation upon a person for a violation of this act.

HISTORY: CL 1929, 287;—CL 1948, 323.10;—Rep. 1949, p. 123, Act 117, Imd. Eff. May 17;—Add. 1965, p. 617, Act 328, Eff. Mar. 31, 1966;—Am. 1965, p. 825, Act 405, Imd. Eff. Oct. 29;—Am. 1970, p. 574, Act 200, Eff. Apr. 1, 1971;—Am. 1972, p. 257, Act 159, Eff. Mar. 30, 1973;—Am. 1972, p. 901, Act 293, Eff. Apr. 15, 1973;—Am. 1973, p. 17, Act 3, Imd. Eff. Mar. 16.

323.11 Definitions.

Sec. 11. As used in this act:

(a) "Person" means any municipality, industry, public or private corporation, copartnership, firm or any other entity whatsoever.

(b) "Waters of the state" means ground waters, lakes, rivers and streams and all other water courses and waters within the confines of the state and also the Great Lakes bordering thereon.

(c) "Municipality" means the state, a county, city, village or township or an agency or instrumentality of any of them.

HISTORY: CL 1929, 288;—CL 1948, 323.11;—Am. 1972, p. 901, Act 293, Eff. Apr. 15, 1973.

323.12 Construction of act.

Sec. 12. This act shall not be construed as repealing any of the provisions of the law governing the pollution of lakes and streams, but shall be held and construed as ancillary to and supplementing the same and in addition to the laws now in force, except as the same may be in direct conflict herewith. This act shall not be construed as applying to copper or iron mining operations, whereby such operations result in the placement, removal, use or processing of copper or iron mineral tailings or copper or iron mineral deposits from such operations being placed in inland waters on bottom lands owned by or under the control of the mining company and only water which may contain a minimal amount of residue as determined by the water resources commission resulting from such placement, removal, use or processing being allowed or permitted to escape into public waters; or applying to the discharge of water from underground iron or copper mining operations subject to a determination by the water resources commission.

HISTORY: CL 1929, 289;—CL 1948, 323.12;—Am. 1965, p. 617, Act 328, Eff. Mar. 31, 1966;—Am. 1965, p. 825, Act 405, Imd. Eff. Oct. 29.

323.12a Provision of act; supplemental construction.

Sec. 12a. The provisions of this act shall be construed as supplemental to and in addition to the provisions of Act No. 316 of the Public Acts of 1923, as amended, being sections 261.1 to 277.10, inclusive, of the Compiled Laws of 1948; and nothing in this act shall be construed to amend or repeal any law of the state of Michigan relating to the public service commission, the department of conservation and the department of health relating to waters and water structures, or any act or parts of acts not inconsistent with the provisions of this act.

HISTORY: Add. 1949, p. 122, Act 117, Imd. Eff. May 17.

323.13 Surveillance fee; notice; payment; report; formula; rules.

Sec. 13. (a) In order to provide for increased surveillance, investigation, monitoring and other activities necessary to provide greater protection of the quality of waters of this state, an annual surveillance fee is payable by a person, company, corporation, but not a municipality, that discharges water-borne waste directly or indirectly into the waters of this state from a manufacturing facility; or from any other commercial establishment that generates a discharge inconsistent with the protection of waters of this state. The fee shall be for the cost of surveillance of industrial and commercial discharges and receiving waters. The cost of necessary surveillance of municipal discharges shall not be financed from annual surveillance fees, but may be financed as otherwise provided by law. The total surveillance fees assessed annually on discharges shall not exceed the total amount appropriated to the commission or other appropriate state agency. Surveillance fees shall be restricted to:

(a) Surveillance, inspection, and pollution prevention including necessary data collection, compliance sampling and analysis directly related to the operations of the fee payers in the aggregate.

(b) Evaluation and issuance of permits to surveillance fee payers.

(c) Administrative support, including laboratory, sampling and monitoring equipment directly related to the dischargers who pay surveillance fees in the aggregate.

(2) Before February 2, of each year the commission shall inform each discharger and the state treasurer of the annual surveillance fee due from each plant location or major manufacturing component and commercial enterprise, as provided by rule. Except as provided in subsection (6), if notice is not made before February 2 in any year, the surveillance fee shall remain the same as the previous year. High quality agricultural wastewater, which is not discharged directly into a lake or stream but is diverted in accordance with an approved agromanagement plan for irrigation at a rate which approximates the rate of plant uptake and results from normal agricultural operations such as cooling, heating, washing, conveying, transporting, or holding fruit or vegetables shall be exempt from the surveillance fee.

(3) Before March 2 of each year a discharger shall pay to the state treasurer the amount of surveillance fee due. The state treasurer shall deposit the fee in the general fund of this state. The treasurer shall report the total amount collected to the governor and the legislature before April 16 of each year.

WATER RESOURCES COMMISSION

(4) The annual surveillance fee shall be based on an administrative fee of $50.00 and an additional fee set by the commission. The additional fee shall be determined on a graduated basis using a formula developed by rules of the commission promulgated pursuant to Act No. 306 of the Public Acts of 1969, as amended, being sections 24.201 to 24.315 of the Michigan Compiled Laws. The formula shall include the volume and nature of discharge, number of discharge locations, variability of flow volume, stream characteristics, required laboratory tests, area surveillance, difficulty of survey setup, history of compliance and provisions for compliance, and other factors that the commission considers appropriate to establish the total amount surveillance fee. The maximum annual fee assessed shall not exceed $18,000.00 per manufacturing location. For the fischa year beginning October 1, 1980, the legislative appropriations conversion factor, which is used to match the total surveillance fee billings with the authorized appropriation, shall not exceed $5.80. A discharger shall not be assessed a fee if the total fee calculated by the formula is $50.00 or less. A discharger into a municipal sewerage system shall be assessed only the $50.00 administrative fee. However, if the discharge, after municipal treatment, is or will become injurious to the waters of this state under section 6, the assessment will be based upon the same consideration as if the discharge, after treatment, were being discharged by the manufacturing facility or commercial establishment directly into the waters of the state. The commission shall promulgate rules necessary to implement this section.

(5) The total surveillance fees assessed annually shall not exceed the total amount appropriated to the Department of Natural Resources or other appropriate state or local agency for surveillance. The total amount of revenue generated annually by water pollution surveillance fees shall not comprise more than 41% of the total funding support from all sources for the fiscal year beginning October 1, 1980, 30% for the fiscal year beginning October 1, 1982, 10% for the fiscal year beginning October 1, 1983, and 0% for the fiscal year beginning October 1, 1984 and thereafter, as appropriated by the legislature, of the state water pollution control and abatement programs authorized by this act. All surveillance fees shall be reduced each year by a percentage equal to the percentage by which total surveillance fees are reduced from the previous fiscal year pursuant to this subsection.

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(6) For the year 1981 only, the commission shall inform a discharger and the state treasurer of the annual surveillance fee due from each plant location or major manufacturing component and commercial enterprise, as provided by rule not later than two weeks after the effective date of this subsection. For the year 1981 only, a discharger shall pay to the state treasurer the amount of surveillance fees due not later than six weeks after the effective date of this subsection.

APPENDIX B

1981 Wastewater Report Forms and Instructions

Michigan Department of Natural Resources
Act 293 Reports
P.O. Box 30033
Lansing, Michigan 48909

Postmaster: Return Postage Guaranteed

Bulk Rate
U.S. Postage
PAID
Lansing, Mich.
Permit 1200

ATTENTION PERSON IN CHARGE OF ENVIRONMENTAL ACTIVITIES

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

1981

WASTEWATER REPORT FORMS AND INSTRUCTIONS

Completion And Return Of This Form Is Required By State Law

Deadline for filing is December 15, 1981.

This booklet contains the necessary forms and instructions for reporting of wastewater and critical materals data to comply with Michigan Act 293, P.A. 1972. All businesses which discharge wastewater other than sanitary wastewater, to the waters of the State (including groundwaters and sewer systems), are required to file this annual report.

A separate report is required for each location at which your company does business.

IF MORE THAN ONE BOOKLET IS RECEIVED FOR THE SAME FACILITY MARK DUPLICATE AND RETURN MAILING LABEL PAGE.

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4833-9670

GENERAL INSTRUCTIONS

Information supplied in this report should reflect your company's operation during calendar year 1981. This will necessitate preparing the report prior to the end of the reporting period in order to meet the December 15, 1981, filing deadline. In the event of significant change in wastewater disposal after the report has been filed, an amendment to the report outlining the change should be filed. Also, an interim report is required when:

1. The use of a Critical Material not previously reported is commenced during the year, or
2. Usage or discharge of a Critical Material increases sufficiently to move the level of usage or discharge into a higher category on the Critical Materials report (Form III, Page 15).
3. Use or discharge of a Critical Material is discovered after Critical Materials Report is filed.

Whatever the nature of your business and resulting waste disposal practices take the time to completely and accurately fill out the forms since surveillance fees will be calculated using data directly from the forms. Any omission of data affecting the fee calculation can automatically result in the entering of the maximum value for that factor in the calculation formula.

Read the instructions carefully and fully before beginning to complete the forms. Refer to pages 3, 8, 11, 14 and 16 for examples of completed forms properly filled out for an imaginary company.

* Indicates new or changed information required in forms.

If you have any questions or require help in completing the forms you may call the following person for assistance:

Forms 1 and 2: Jack Karr
(517) 373-8054

Forms 3 and 4: Office Of Toxic Materials Control
(517) 374-9640

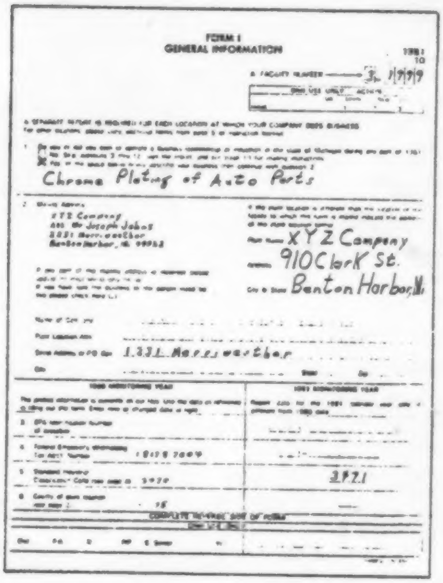
STANDARD COUNTY CODES

Code	County
01	Alcona
02	Alger
03	Allegan
04	Alpena
05	Antrim
06	Arenac
07	Baraga
08	Barry
09	Bay
10	Benzie
11	Berrien
12	Branch
13	Calhoun
14	Cass
15	Charlevoix
16	Cheboygan
17	Chippewa
18	Clare
19	Clinton
20	Crawford
21	Delta
22	Dickinson
23	Eaton
24	Emmet
25	Genesee
26	Gladwin
27	Gogebic
28	Grand Traverse
29	Gratiot
30	Hillsdale
31	Houghton
32	Huron
33	Ingham
34	Ionia
35	Iosco
36	Iron
37	Isabella
38	Jackson
39	Kalamazoo
40	Kalkaska
41	Kent
42	Keweenaw
43	Lake
44	Lapeer
45	Leelanau
46	Lenawee
47	Livingston
48	Luce
49	Mackinac
50	Macomb
51	Manistee
52	Marquette
53	Mason
54	Mecosta
55	Menominee
56	Midland
57	Missaukee
58	Monroe
59	Montcalm
60	Montmorency
61	Muskegon
62	Newaygo
63	Oakland
64	Oceana
65	Ogemaw
66	Ontonagon
67	Osceola
68	Oscoda
69	Otsego
70	Ottawa
71	Presque Isle
72	Roscommon
73	Saginaw
74	St. Clair
75	St. Joseph
76	Sanilac
77	Schoolcraft
78	Shiawassee
79	Tuscola
80	VanBuren
81	Washtenaw
82	Wayne
83	Wexford

INSTRUCTIONS FOR FORM I

1. Review and correct data if any exists that is computer printed on the form. Fill in any missing data including the mailing address. If the mailing address on Form I is not correct or missing, enter the correct mailing address in the blocked spaces on Form I as per the instructions on that form.
2. **Be sure to enter the facility number (Item A) in the upper right hand corner of Form I if it is not there.** The facility number is the six digit number above your mailing address.

EXAMPLE



FORM I
GENERAL INFORMATION

1981

Chrome Plating of Auto Parts

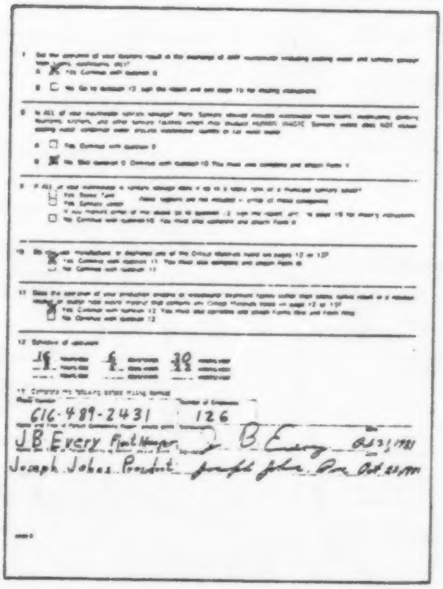
XYZ Company
Att. Mr Joseph Jobes
1331 Merriweather
Benton Harbor, MI 49022

XYZ Company
910 Clark St.
Benton Harbor, Mi

1331 Merriweather

3721

EXAMPLE



616-489-2431

126

J.B. Every Plant Manager

Joseph Jobes President

3. Number given to your facility by the U.S. Environmental Protection Agency should be indicated for item 3 if you have received this identification number.
4. The Federal Employer's Withholding Tax Account No. (Item 4) can be obtained from your payroll office.
5. You may need to refer to the Tables on pages 2 and 4 of this booklet to complete Items 5 and 6.
6. Read questions 7 through 11 carefully before answering. Note definitions and instructions associated with the questions.
7. Be sure to include forms II, III, and IV if your answers to questions on Form I indicate that these forms are required.
8. Signatures are required in the areas entitled "Name and Title of Person Completing Report" and "Name and Title of Person Certifying Report." An example of Form I is shown to the left.

STANDARD INDUSTRIAL CLASSIFICATION CODES

Note: This is an edited list. Choose the code which best describes your facility.
Call Office of Toxic Materials Control (517) 374-9640 if you have questions.

AGRICULTURE

Code	Title
0100	AGRICULTURAL PRODUCTION—CROPS
0200	AGRICULTURAL PRODUCTION—LIVESTOCK
0211	Beef Cattle Feedlots
0241	Dairy farms
0700	AGRICULTURAL SERVICES

MINING

Code	Title
1000	METAL MINING
1011	Iron Ores
1021	Copper ores
1081	Metal mining services
1300	OIL AND GAS EXTRACTION
1380	Oil and Gas Field Services
1400	NONMETALIC MINERALS
1422	Crushed and broken limestone
1440	Sand and Gravel
1450	Clay and Related Minerals
1470	Chemical and Fertilizer Minerals
1492	Gypsum

CONSTRUCTION

Code	Title
1500	GENERAL BUILDING CONTRACTORS
1600	HEAVY CONSTRUCTION CONTRACTORS

MANUFACTURING

Code	Title
2000	FOOD AND KINDRED PRODUCTS
2010	Meat Products
2011	Meat packing plants and slaughter houses
2020	Dairy Products
2030	Preserved Fruits & Vegetables
2033	Canned fruits and vegetables
2035	Pickles, sauces, and salad dressings
2037	Frozen fruits and vegetables
2040	Grain Mill Products
2043	Cereal breakfast foods
2047	Dog, cat, and other pet food
2050	Bakery Products
2060	Sugar and Confectionary Products
2063	Beet sugar
2070	Fats and Oils
2076	Vegetable oil mills
2077	Animal and marine fats & oils
2080	Beverages
2082	Malt beverages
2084	Wines, brandy, and brandy spirits.
2085	Distilled liquor, except brandy
2086	Bottled and canned soft drinks
2087	Flavoring extracts and sirups, nec.
2090	Misc. Foods and Kindred Products
2091	Canned and cured seafoods
2092	Fresh or frozen packaged fish
2200	TEXTILE MILL PRODUCTS
2300	APPAREL AND OTHER TEXTILE PRODUCTS
2400	LUMBER AND WOOD PRODUCTS
2420	Sawmills and Planing Mills
2430	Millwork, Plywood & Structural Members
2440	Wood Containers
2448	Wood pallets and skids
2450	Wood Buildings and Mobile Homes
2490	Miscellaneous Wood Products
2491	Wood preserving
2492	Particleboard
2500	FURNITURE AND FIXTURES
2600	PAPER AND ALLIED PRODUCTS
2611	Pulp mills
2621	Paper mills, except building paper
2631	Paperboard mills
2640	Misc. Converted Paper Products
2650	Paperboard Containers and Boxes
2661	Building paper and board mills
2700	PRINTING AND PUBLISHING
2710	Newspapers
2750	Commercial Printing
2790	Printing Trade Services

Manufacturing-cont'd.

Code	Title
2800	CHEMICALS AND ALLIED PRODUCTS
2810	Industrial Inorganic Chemicals
2820	Plastics Materials and Synthetics
2830	Drugs
2840	Soap, Cleaners, and Toilet Goods
2850	Paints and Allied Products
2860	Industrial Organic Chemicals
2870	Agricultural Chemicals
2890	Miscellaneous Chemical Products
2891	Adhesives and sealants
2892	Explosives
2893	Printing inks
2899	Salt (by evaporation)
2900	PETROLEUM AND COAL PRODUCTS
2911	Petroleum refining
2950	Paving and Roofing Materials
3000	RUBBER AND MISC. PLASTIC PRODUCTS
3011	Tires and inner tubes
3069	Fabricated rubber products
3079	Miscellaneous plastic products
3100	LEATHER AND LEATHER PRODUCTS
3111	Leather tanning and finishing
3200	STONE, CLAY, AND GLASS PRODUCTS
3220	Glass and Glassware, Pressed or Blown
3241	Cement
3250	Structural Clay Products
3260	Pottery and Related Products
3270	Concrete, Gypsum, and Plaster Products
3271	Concrete block and brick
3273	Ready-mixed concrete
3274	Lime
3275	Gypsum products
3290	Misc. Nonmetallic Mineral Products.
3291	Abrasive products
3292	Asbestos products
3295	Minerals, ground or treated
3297	Nonclay refractories
3300	PRIMARY METAL INDUSTRIES
3310	Blast Furnaces and Basic Steel Products
3312	Blast furnaces and steel mills
3313	Electrometallurgical products
3315	Steel wire and related products
3316	Cold finishing of steel shapes
3317	Steel pipe and tubes
3320	Iron and Steel Foundries
3321	Gray iron foundries
3322	Malleable iron foundries
3330	Primary Nonferrous Metals
3331	Primary copper
3332	Primary lead
3333	Primary zinc
3334	Primary aluminum
3340	Secondary Nonferrous Metals
3360	Die Casting
3361	Aluminum foundries
3362	Brass, bronze, and copper foundries
3390	Miscellaneous Primary Metal Products
3398	Metal heat treating
3400	FABRICATED METAL PRODUCTS
3410	Metal Cans and Shipping Containers
3420	Cutlery, Hand Tools, and Hardware
3430	Plumbing and Heating, Except Electric
3440	Fabricated Structural Metal Products
3442	Metal doors, sash, and trim
3443	Fabricated plate work (boiler shops)
3444	Sheet metal work
3450	Screw Machine Products, Bolts, etc.
3460	Metal Forgings and Stampings
3462	Iron and steel forgings
3463	Nonferrous forgings
3465	Automotive stampings
3470	Metal Services
3471	Plating and polishing
3479	Metal coating and allied services
3480	Ordnance and Accessories
3490	Misc. Fabricated Metal Products
3500	MACHINERY, EXCEPT ELECTRICAL
3510	Engines and Turbines
3520	Farm and Garden Machinery
3530	Construction and Related Machinery
3540	Metalworking Machinery
3550	Special Industry Machinery
3560	General Industrial Machinery
3570	Office and Computing Machines
3580	Refrigeration and Service Machinery
3590	Misc. Machinery, Except Electrical
3600	ELECTRIC AND ELECTRONIC EQUIPMENT
3610	Electric Distributing Equipment
3620	Electrical Industrial Apparatus
3630	Household Appliances
3640	Electric Lighting and Wiring Equipment
3650	Radio and TV Receiving Equipment
3660	Communication Equipment
3670	Electronic Components and Accessories
3690	Misc. Electrical Equipment & Supplies

Manufacturing-cont'd.

Code	Title
3700	TRANSPORTATION EQUIPMENT
3710	Motor Vehicles and Equipment
3711	Motor vehicles and car bodies
3714	Motor vehicle parts and accessories
3715	Truck trailers
3720	Aircraft and Parts
3730	Ship and Boat Building and Repairing
3740	Railroad Equipment
3750	Motorcycles, Bicycles, and Parts
3760	Guided Missles, Space Vehicles, Parts
3790	Miscellaneous Transportation Equipment
3792	Travel Trailers and campers
3795	Tanks and Tank Components
3800	INSTRUMENTS AND RELATED PRODUCTS
3810	Engineering and Scientific Instruments
3820	Measuring and Controlling Devices
3830	Optical Instruments and Lenses
3840	Medical Instruments and Supplies
3860	Photographic Equipment and Supplies
3900	MISCELLANEOUS MANUFACTURING INDUSTRIES
3910	Jewelry, Silverware, and Plated Ware
3930	Musical Instruments
3940	Toys and Sporting Goods
3950	Pens, Pencils, Office and Art Supplies
3990	Miscellaneous Manufactures

TRANSPORTATION

Code	Title
4010	RAILROADS
4200	TRUCKING AND WAREHOUSING
4210	Trucking, Local and Long Distance
4214	Hauling Liquid Wastes
4221	Farm product warehousing and storage
4222	Refrigerated Warehousing
4230	Trucking Terminal Facilities
4400	WATER TRANSPORTATION
4430	Great Lakes Transportation
4440	Transportation on Rivers and Canals
4452	Ferries
4454	Towing and tugboat service
4460	Water Transportation Services.
4463	Marine cargo handling

SERVICES

Code	Title
4900	ELECTRIC, GAS, AND SANITARY SERVICES
4911	Electric services
4925	Gas production and/or distribution
4953	Refuse systems
5810	EATING AND DRINKING PLACES
6512	OFFICE BUILDINGS
7000	HOTELS AND OTHER LODGING PLACES
7011	Hotels, motels, and tourist courts
7030	Camps and Trailering Parks
7032	Sporting and recreational camps
7210	LAUNDRY, CLEANING & GARMET SERVICES
7215	Coin-operated laundries
7391	LABORATORIES — TESTING AND RESEARCH
7399	Water Softener Service
7500	AUTO REPAIR, SERVICES, AND GARAGES
7530	Automotive Repair Shops
7542	Car washes
7900	AMUSEMENT & RECREATION SERVICES
7933	Bowling alleys
7940	Commercial Sports
7941	Sports clubs and promoters
7948	Racing, including track operation
7992	Public golf courses
7996	Amusement parks
7997	Membership sports & recreation clubs
8000	HEALTH SERVICES
8050	Nursing and Personal Care Facilities
8060	Hospitals
8070	Medical and Dental Laboratories
8080	Outpatient Care Facilities

FORM I
GENERAL INFORMATION

1981
10

A. FACILITY NUMBER ☐☐☐☐☐☐

DNR USE ONLY - ACTION				
Initial	OK ☐	Delete 1.☐	New 2.☐	Change 3.☐

A SEPARATE REPORT IS REQUIRED FOR EACH LOCATION AT WHICH YOUR COMPANY DOES BUSINESS. For other locations, please copy additional forms from page 5 of instruction booklet.

1. Do you or did you own or operate a business (commercial or industrial) in the state of Michigan during any part of 1981?
   - ☐ No. Skip questions 3 thru 12, sign the report, and see page 19 for mailing instructions.
   - ☐ Yes. In the space below briefly describe your business then continue with question 2.

2. Mailing Address:

If any part of the mailing address is incorrect please update incorrect line(s) only below.
If you have sold the business to the person listed below please check here ☐

If the plant location is different than the location of the facility to which this form is mailed indicate the address of the plant location below.

Plant Name ______

Address ______

City & State ______

Name of Company ______

Plant Location/Attn. ______

Street Address or P.O. Box ______

City ______ State ______ Zip ______

1980 MONITORING YEAR The printed information is currently on our files. Use the data as reference in filling out the form. Enter new or changed data at right.	1981 MONITORING YEAR Report data for the 1981 calendar year only if different from 1980 data.
3. EPA Identification Number (if available)	☐☐☐☐ ☐☐☐☐☐☐☐☐☐
4. Federal Employer's Withholding Tax Acc't. Number	☐☐ – ☐☐☐☐☐☐☐
5. Standard Industrial Classification Code (see page 4)	☐☐☐☐
6. County of plant location (see page 2)	☐☐

COMPLETE REVERSE SIDE OF FORM

— DNR USE ONLY —	
Dist.: F.A.: R.: PIP: S. Sewer: Yr.:	☐ ☐ ☐ ☐ ☐☐☐☐☐☐☐ ☐

R 4888-4

7. Did the operation of your business result in the discharge of ANY wastewater (including cooling water and sanitary sewage from toilets, washrooms, etc.)?

A. ☐ Yes. Continue with question 8.

B. ☐ No. Go to question 13, sign the report and see page 19 for mailing instructions.

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8. Is ALL of your wastewater sanitary sewage? (Note: Sanitary sewage includes wastewater from toilets, washrooms, drinking fountains, kitchens, and other sanitary facilities which may produce HUMAN WASTE. Sanitary waste does NOT include cooling water, condenser water, process wastewater, laundry or car wash water.

A. ☐ Yes. Continue with question 9.

B. ☐ No. Skip question 9. Continue with question 10. You must also complete and attach Form II.

---

9. If ALL of your wastewater is sanitary sewage does it go to a septic tank or a municipal sanitary sewer?

☐ Yes. Septic Tank. (Note: lagoons are not included in either of these categories)
☐ Yes. Sanitary sewer.
If you marked either of the above go to question 13, sign the report, and see page 19 for mailing instructions.
☐ No. Continue with question 10. You must also complete and attach Form II.

---

10. Do you use, manufacture, or discharge any of the Critical Materials listed on pages 12 or 13?

☐ Yes. Continue with question 11. You must also complete and attach Form III.
☐ No. Continue with question 11.

---

11. Does the operation of your production process or wastewater treatment facility (other than septic tanks) result in a residual, residue or sludge type waste material that contains any Critical Materials listed on page 12 or 13?

☐ Yes. Continue with question 12. You must also complete and attach Forms III(s) and Form IV(s).
☐ No. Continue with question 12.

---

12. Schedule of operation

______ hours/day ______ days/week ______ weeks/year
______ hours/day ______ days/week ______ weeks/year
______ hours/day ______ days/week ______ weeks/year

13. Complete the following before mailing form(s)

Phone Number	Number of Employees	
Name and Title of Person Completing Report (please print)	Signature	Date
Name and Title of Person Certifying Report (please print)	Signature	Date

INSTRUCTIONS FOR FORM II — WASTEWATER OUTFALL REPORT

Review Computer Printed Data On Form II. Fill In Any Missing Or Incorrect Information In The Spaces Provided.

An outfall, for purposes of this report, is considered to be any point at which wastewater enters the waters of the State (including groundwaters) or a sewer system. Complete a copy of Form II for each wastewater discharge. If more than one outfall is to be reported, Form II may be duplicated from page 9 of this booklet; or in the event you did not receive a computer print sheet for all of your outfalls, it will be necessary for you to use or duplicate page 9.

Item A — (Facility Number) If this is a newly reported outfall, begin the report by copying the code number from the mailing label in the spaces provided.

Item B — (Outfall Identification) Identify the outfall by providing the outfall number as you normally refer to it. If you have no special designations for outfalls, number them 001, 002, etc.

Item C — (MOR report number) If you submit monthly operating reports (MOR's) enter the appropriate outfall number in the space so marked.

Item D — (Word description) Briefly describe the nature and source of the wastewater from this outfall, a description of the outfall and the geographical location of the outfall. A marked and scaled map may be enclosed to satisfy the location requirement. Outfall description and location is not required if the discharge is to a municipal sanitary sewer.

Item E — (Discharge type) Write in the space provided on the right hand side of the form, the number corresponding to the type of discharge. For surface water discharges, list the name of the receiving water. A DISCHARGE TO A STORM SEWER which directly enters the watercourse is a SURFACE WATER DISCHARGE and must be reported as such. Lagoons with an outlet to surface waters must be reported as surface water discharges. Discharges to combined storm-sanitary sewer systems may be reported as municipal sanitary discharges. If the discharge is to a municipal sanitary sewer, give the name of the municipality providing treatment if different, in addition to the name of the sanitary sewer owner.

Item F — (Volume of discharge) Flow figures (average, maximum and total) are to be reported in the appropriate spaces on the righthand side of the form in units of million gallons per day (MGD). For example:

500 gallons per day = └─┴─┴─┴─┘ . └0┴0┴0┴5┘ MGD
5,000 gallons per day = └─┴─┴─┴─┘ . └0┴0┴5┴─┘ MGD
50,000 gallons per day = └─┴─┴─┴─┘ . └0┴5┴─┴─┘ MGD
500,000 gallons per day = └─┴─┴─┴─┘ . └5┴─┴─┴─┘ MGD
5,000,000 gallons per day = └─┴─┴─┴5┘ . └─┴─┴─┴─┘ MGD
5,555,000 gallons per day = └─┴─┴─┴5┘ . └5┴5┴5┴─┘ MGD

Round off flow figures as necessary to fit in the spaces provided (less than 100 gal/day should be rounded off to .0001). The average daily flow figure should be based on the number of days during the year on which the outfall is discharged.

$$\text{Average Daily Flow} = \frac{\text{total outfall discharge volume for the year}}{\text{number of days discharge took place}}$$

NOTE: If you purchase all your water from a utility, you can determine wastewater volume by referencing billings for the past year. Water utilities frequently meter consumption in units of cubic feet or hundreds of cubic feet. Convert cubic feet to gallons by multiplying by 7.5. Hundreds of cubic feet is converted by multiplying by 750.

List actual discharges which occurred during the reporting year adjusted to represent a full year's basis.

EXAMPLE: Total Annual Flow From Jan. 1 to Sept. 30 = 9 million gallons
9 million gallons divided by 9 months = 1 million gallons per month

If it is expected that the last three months of the year will also average 1 million gallons per month, then you should indicate an annual flow of 12 million gallons. If past history has indicated that the last three months of the year have either higher or lower flow volumes than the first 9 months, then adjust your total annual flow accordingly.

Indicate whether flow figures reported were measured or estimated by placing a check in the correct box.

Item G — (Type of wastewater) Indicate on the righthand side of the form in the spaces provided, the type of wastewater discharged by the outfall in relative percentages adding up to 100 percent. DO NOT ENTER FRACTIONS OR DECIMALS. For purposes of this report, sanitary wastewater includes human sewage only, and cooling and condenser wastewater includes only uncontaminated water, resulting from these practices. All other forms of wastewater are considered process wastewater.

INSTRUCTIONS FOR FORM II — Continued

Note: Facility number must be entered here

Note: Describe the outfall and its location

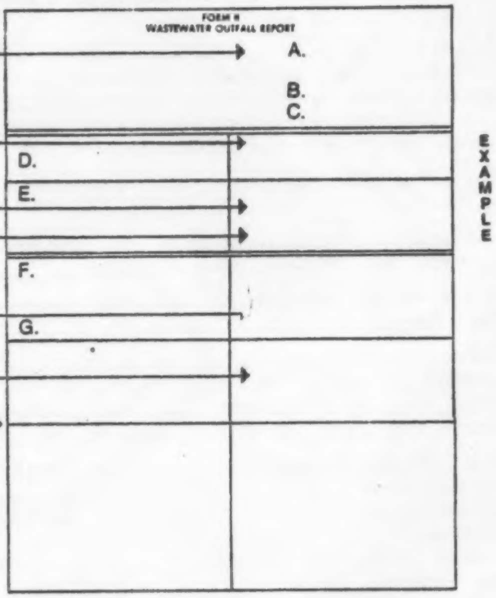
Note: If the discharge is to a surface water, indicate the name of the surface water

Note: If the discharge is to a municipal sanitary sewer, name the municipality operating the sewer and providing the treatment if different

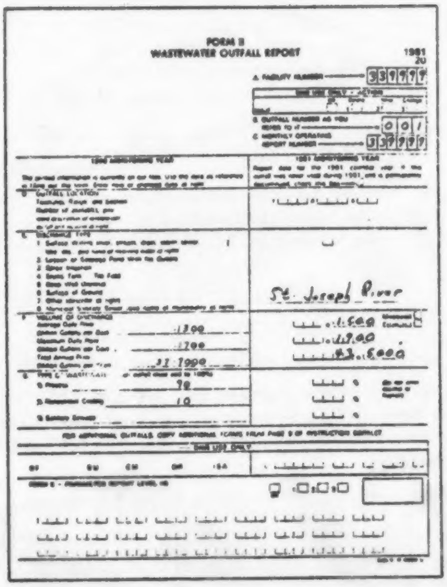
Note: Report flow in million gallons per day MGD

Note: Total percentages must add up to 100%

Note: Do not write below this line



Sample Problem: XYZ Company is an electroplating firm located in Benton Harbor that has two wastewater outfalls. One discharges directly to the St. Joseph River and the other discharges to a seepage lagoon on their property. The following illustration represents a properly completed form they might have returned:



FORM II
WASTEWATER OUTFALL REPORT

1981

0 0 1

St. Joseph River

FORM II
WASTEWATER OUTFALL REPORT

1981
20

A. FACILITY NUMBER →

DNR USE ONLY – ACTION				
Initial	OK ☐	Delete 1.☐	New 2.☐	Change 3.☐

B. OUTFALL NUMBER AS YOU REFER TO IT →

C. MONTHLY OPERATING REPORT NUMBER →

1980 MONITORING YEAR	1981 MONITORING YEAR
The printed information is currently on our files. Use the data as reference in filling out the form. Enter new or changed data at right.	Report data for the 1981 calendar year. If this outfall was never used during 1981 and is permanently discontinued, check this box → ☐
D. OUTFALL LOCATION: Township, Range, and Section Number (if available); *give word description of wastewater, outfall and location at right*	T.___ R.___ S.___
E. DISCHARGE TYPE: 1. Surface Waters (river, stream, drain, storm sewer, lake, etc.; *give name of receiving water at right)* 2. Lagoon or Seepage Pond With No Outlets 3. Spray Irrigation 4. Septic Tank – Tile Field 5. Deep Well Disposal 6. Surface of Ground 7. Other (describe at right) 8. Municipal Sanitary Sewer (give name of municipality at right)	☐
F. VOLUME OF DISCHARGE Average Daily Flow (Million Gallons per Day)	___ • ___ Measured ☐ Estimated ☐
Maximum Daily Flow (Million Gallons per Day)	___ • ___
Total Annual Flow (Million Gallons per Year)	___ • ___
G. TYPE OF WASTEWATER (each outfall must add to 100%) % Process	___ % (Do not enter decimal or fraction)
% Noncontact Cooling	___ %
% Sanitary Sewage	___ %

FOR ADDITIONAL OUTFALLS, COPY ADDITIONAL FORMS FROM PAGE 9 OF INSTRUCTION BOOKLET

— DNR USE ONLY —					
DF.:	D.U.:	C.M.:	Diff.:	I.S.A.:	

FORM II – PARAMETER REPORT LEVEL 40

☐ OK 1.☐ 2.☐ 3.☐

R 4838-5

INSTRUCTIONS FOR FORM III

GUIDELINES FOR REPORTING OF CRITICAL MATERIALS

Any Critical Materials, Table III (pages 12 and 13), being **discharged** must be reported regardless of their origin, unless these critical materials originate in intake water.

Except as noted below, all Critical Materials **used** or **manufactured** must be reported even if the Critical Materials are recovered or do not come in contact with water.

> Inorganic Critical Materials (Sec. I) present as incidental trace contaminants in other substances being used need not be reported. **Incidental trace contaminants** are materials not purposefully added and present at concentrations less than 1% by weight.
>
> Organic Critical Materials (Sec. II) present as incidental trace contaminants in another host substance being used need be reported only by manufacturer of the host substance. **Incidental trace contaminants** are materials not purposefully added and present at concentrations less than 1% by weight.
>
> Pesticides (Sec. III), drugs, food additives and naturally occuring chemicals (Sec. IV), need be reported only by their manufacturers and formulators.
>
> Critical Materials used strictly in analytical laboratory quantities (less than 1 pound) need not be reported.
>
> Critical Materials incorporated structurally or mechanically in your plant buildings (e.g. copper pipe, chromium plated hardware, treated wood) need not be reported.
>
> Critical Materials which are a fixed part of pre-manufactured assemblies or hardware obtained from another manufacturer and incorporated without change into your product need not be reported.

Additional information regarding these instructions for Form III, the Critical Materials Program, or individual Critical Materials may be obtained from the Office of Toxic Materials Control (517) 374-9640.

There have been additions to and deletions from the Critical Materials Register. Newly added materials are marked with an asterisk (*). Rule 233 of Part 9 of the Administrative Rules governing this program provide that one year's notice be given before reporting of new Critial Materials is compulsory. It is not mandatory that your report include these added materials (*) this year. We ask that you voluntarily supply as much information as you can on these materials (*).

Note: The inclusion of any chemical on the Critical Materials Register (pages 12 and 13) does not mean that these chemicals can not or should not be used. The Critical Materials Register is a list of chemicals that can be harmful if misused or disposed of improperly. Also, if a certain chemical does not appear on the Critical Materials Register, it does not mean that the chemical is not dangerous. Chemicals not on the Critical Materials Register may be harmful but not included on the list because adequate studies have not yet been conducted concerning their harmful effects.

COMPLETION OF FORM III

DO NOT DUPLICATE 1980 COMPUTER PRINTED INFORMATION IF CORRECT FOR 1981.
ENTER ONLY CORRECTIONS OR ADDITIONS.

I. Complete one copy of Form III for **each** Critical Material in Table III, pages **12 and 13**, which is **used, manufactured, discharged,** and/or **contained in a residual** at your facility. The Critical Materials are to be reported on a facility-wide basis (example on page 11).

INSTRUCTIONS FORM III — Continued

II. To report not previously reported critical materials for 1981, a blank form (page 15) has been provided for duplication purposes. Instructions for filling out blank forms are as follows:

Reproduced from best available copy.

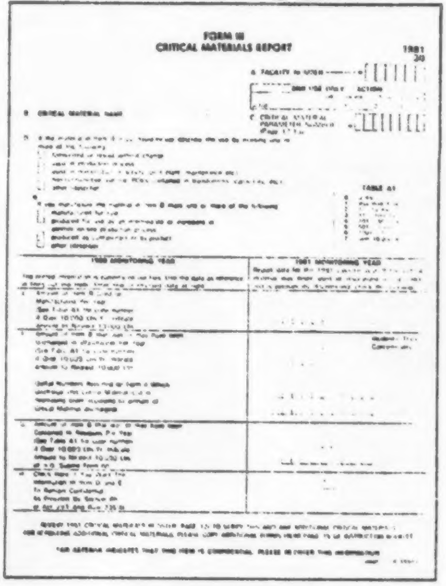
Part A — Copy six digit facility identification code from mailing label.

Parts B, C — Fill in critical material name and parameter number from Table III.

Part D — Indicate type of use or manufacture of the Critical Material by marking appropriate box(es).

Parts E, F, G — Indicate the amount in pounds per year for each category with the code number that corresponds to Table A1 (on Form III). If amount is over 10,000 lbs., enter Code 7 and the amount to the nearest 10,000 lbs. After indicating amount discharged check box in Part F if Critical Material is incidential trace contaminant. (Note: List outfalls in decreasing order of amounts of Critical Material being discharged.)

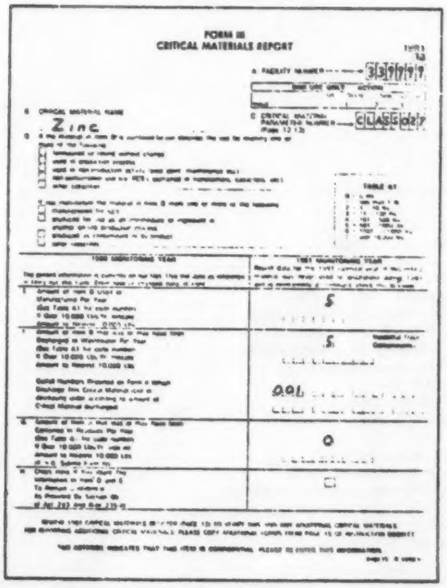
Part H — Indicate if confidentiality is desired for information in Parts D and E.
(**Note** to 1980 reporters: If confidentiality was requested in 1980, please re-enter information and indicate 1981 confidentiality desired.)



FORM III
CRITICAL MATERIALS REPORT

1981

EXAMPLE FORM III



FORM III
CRITICAL MATERIALS REPORT

1981

Zinc

TABLE A1

1980 MONITORING YEAR

1981 MONITORING YEAR

EXAMPLE OF COMPLETED FORM III

Company XYZ has a sanitary and cooling water discharge. They use a water treatment additive which contains zinc and will be discharged in the cooling water. They must file a complete Form III.

Additional examples on Page 14.

Michigan Water Resources Commission
CRITICAL MATERIALS REGISTER
Published October 1, 1981

With the exception of Critical Material classes (where all compounds of the material are to be reported) the parameter number assigned each Critical Material is from the Chemical Abstract Service "Registry Handbook." Additional information concerning the Critical Materials Program and the individual materials may be obtained by writing:

Critical Materials Program
Office of Toxic Materials Control
Ehvironmental Services Division
Michigan DNR
P.O. Box 30028
Lansing, Michigan 48909

I. Inorganic Materials

A. The following inorganic materials and *all their compounds* are to be reported.

	Parameter Number
antimony	Class-01-0
arsenic	Class-01-1
beryllium	Class-01-2
cadmium	Class-01-3
chromium	Class-01-5
cobalt	Class-01-6
copper	Class-01-7
cyanides	Class-01-8
hypochlorite	Class-01-4
lead	Class-01-9
lithium	Class-02-0
mercury	Class-02-1
nickel	Class-02-2
selenium	Class-02-3
silver	Class-02-4
zinc	Class-02-7

B. The following specific inorganic materials are to be reported (do not report compounds).

	Parameter Number
chloramines	Class-08-6
chlorine	07782-50-5
hydrazine	00302-01-2
hydrogen sulfide	07783-06-4

II. Organic Materials

	Parameter Number
acetone cyanohydrin	00075-86-5
2-acetylaminofluorene	00053-96-3
acrolein	00107-02-8
acrylic acid	00079-10-7
acrylonitrile	00107-13-1
allyl chloride	00107-05-1
2-aminoanthraquinone	00117-79-3
aminoazobenzene	00060-09-3
o-aminoazotoluene	00097-56-3
4-aminobiphenyl	00092-67-1
3-amino-9-ethylcarbazole	00132-32-1
1-amino-2-methylanthraquinone	00082-28-0
aminotriazole (amitrole)	00061-82-5
aniline	00062-53-3
aniline hydrochloride	00142-04-1
o-anisidine	00090-04-0
o-anisidine hydrochloride	00134-29-2
benz(a)anthracene	00056-55-3
benzene	00071-43-2
benzidine	00092-87-5
benzidine salts	Class-08-7
benzo(a)pyrene	00050-32-8
brucine	00357-57-3
carbon tetrachloride	00056-23-5
chlorinated dibenzofurans	Class-05-3
chlorinated dioxins	Class-05-4
1-chloro-2,3-epoxypropane	00106-89-8
bis(2-chloroethyl)ether	00111-44-4
chloroform	00067-66-3
bis(chloromethyl)ether	00542-88-1
3-(chloromethyl)pyridine hydrochloride	06959-48-4
1-(4-chlorophenyl)-3, 3-dimethyl triazene	07203-90-9
4-chloro-m-phenylenediamine	05131-60-2
4-chloro-o-phenylenediamine	00095-83-0
chloroprene	00126-99-8
5-chloro-o-toluidine	00095-79-4
p-cresidine (5-methyl-o-anisidine)	00120-71-8
2,4-diaminoanisole sulfate	39156-41-7
4,4'-diaminodiphenyl ether	* 00101-80-4
2,4-diaminotoluene	00095-80-7
dibenz(a,h)anthracene	00053-70-3
tris(dibromopropyl)phosphate	00126-72-7
di-n-butyl phthalate	00084-74-2
3,3'-dichlorobenzidine	00091-94-1
3,3'-dichlorobenzidine salts	Class-08-8
1,2-dichloroethane	00107-06-2
1,2:3,4-diepoxybutane	00298-18-0
diethyl sulfate	00064-67-5
4-dimethylaminoazobenzene	00060-11-7
dimethylhydrazines	Class-06-2
4,6-dinitro-o-cresol	00534-52-1
2,4-dinitrophenol	00051-28-5
2,4-dinitrotoluene	00121-14-2
di-n-octyl phthalate	00117-84-0
1,4-dioxane	00123-91-1
2,3-epoxy-1-propanal	00765-34-4
ethylene dibromide	00106-93-4
ethyleneimine	00151-56-4
ethylene oxide	00075-21-8
ethylene thiourea	00096-45-7
bis(2-ethylhexyl)phthalate	00117-81-7
ethylmethanesulfonate	00062-50-0
2-(2-formylhydrazino)-4-(5-nitro-2-furyl)-thiazole	03570-75-0
hexachlorobenzene (HCB)	00118-74-1
hexachlorobutadiene	00087-68-3
hexachlorocyclohexane	00608-73-1
hexachlorocyclopentadiene	00077-47-4
hexachloroethane	00067-72-1
hydrazobenzene	00122-66-7
hydroquinone	00123-31-9
N-(2-hydroxyethyl)ethyleneimine	01072-52-2
lactonitrile	00078-97-7
malachite green (C.I. Basic Green 4)	00569-64-2

* indicates new critical material

Organic Materials (continued)

	Parameter Number
methylenebis(2-chloroaniline)	00101-14-4
4,4'-methylenebis(2-methylaniline)	00838-88-0
4,4'-methylenebis(N,N-dimethylaniline	00101-61-1
1,2-(methylenedioxy)-4-propenyl benzene	00120-58-1
methyl hydrazine	00060-34-4
** methyl mercaptan	00074-93-1
1-methylnaphthalene	00090-12-0
2-methyl-1-nitroanthraquinone	00129-15-7
mustard gas	00505-60-2
1,5-naphthalenediamine	02243-62-1
1-naphthylamine	00134-32-7
2-naphthylamine	00091-59-8
5-nitroacenaphthene	00602-87-9
5-nitro-o-anisidine	00099-59-2
4-nitrobiphenyl	00092-93-3
nitrogen mustard	00051-75-2
N-nitroso-n-butyl-N-(4-hydroxybutyl) amine	03817-11-6
* N-nitroso-di-n-butylamine	00924-16-3
N-nitrosodiethylamine	00055-18-5
N-nitrosodimethylamine	00062-75-9
p-nitrosodiphenylamine	00156-10-5
N-nitroso-N-ethylurea	00759-73-9
N-nitroso-N-methylurea	00684-93-5
N-nitroso-N-methylurethane	00615-53-2
N-nitrosomorpholine	00059-89-2
N-nitroso-N-phenylhydroxylamine, ammonium salt	00135-20-6

	Parameter Number
N-nitrososarcosine	13256-22-9
pentachloronitrobenzene	00082-68-8
pentachlorophenol	00087-86-5
peroxyacetic acid	00079-21-0
piperonyl sulfoxide	00120-62-7
polybrominated biphenyls (PBB)	Class-07-8
polychlorinated biphenyls (PCB)	Class-07-9
1,3-propane sultone	01120-71-4
β-propiolactone	00057-57-8
5-propyl-1,3-benzodioxole	00094-58-6
propyleneimine	00075-55-8
semicarbazide	00057-56-7
styrene	00100-42-5
* 1,1,2,2-tetrachloroethane	00079-34-5
tetrachloroethylene (perchloroethylene)	00127-18-4
thioacetamide	00062-55-5
4,4'-thiodianiline	00139-65-1
thiourea	00062-56-6
o-toluidine	00095-53-4
o-toluidine hydrochloride	00636-21-5
triaryl phosphate esters	Class-08-4
1,1,2-trichloroethane	00079-00-5
trichloroethylene	00079-01-6
trichlorophenols	Class-07-6
2,4,5-trimethylaniline	00137-17-7
trimethylphosphate	00512-56-1
xylene	01330-20-7

III. Pesticides (to be reported only by manufacturers and formulators).

	Parameter Number
aldicarb	00116-06-3
aldrin	00309-00-2
4-aminopyridine	00504-24-5
anilazine	00101-05-3
antimycin A	01397-94-0
azinphos-ethyl	02642-71-9
azinphos-methyl	00086-50-0
barban	00101-27-9
bendiocarb	22781-23-3
benomyl	17804-35-2
bromoxynil	01689-84-5
2-(p-*tert*-butylphenoxy)-isopropyl-2-chloroethyl sulfite	00140-57-8
captafol	02425-06-1
captan	00133-06-2
carbaryl	00063-25-2
carbofuran	01563-66-2
carbophenothion	00786-19-6
chlordane	00057-74-9
chlordecone	00143-50-0
chlorfenvinphos	00470-90-6
chlorobenzilate	00510-15-6
chlorpyrifos	02921-88-2
clonitralid	01420-04-8
coumaphos	00056-72-4
crotoxyphos	07700-17-6
cycloheximide	00066-81-9
DDT	00050-29-3
demeton	08065-48-3
diallate	02303-16-4
diazinon	00333-41-5

	Parameter Number
dibromochloropropane (DBCP)	00096-12-8
dichlone	00117-80-6
dichlorvos	00062-73-7
dichrotophos	00141-66-2
dieldrin	00060-57-1
dimethoate	00060-51-5
dinocap	39300-45-3
dinoseb	00088-85-7
dioxathion	00078-34-2
disulfoton	00298-04-4
endosulfan	00115-29-7
endrin	00072-20-8
EPN	02104-64-5
ethion	00563-12-2
fensulfothion	00115-90-2
fenthion	00055-38-9
fluchloralin	33245-39-5
heptachlor	00076-44-8
heptachlor epoxide	01024-57-3
leptophos	21609-90-5
malathion	00121-75-5
methomyl	16752-77-5
methoxychlor	00072-43-5
methyl parathion	00298-00-0
mevinphos	07786-34-7
mexacarbate	00315-18-4
mirex	02385-85-5
monocrotophos	06923-22-4
naled	00300-76-5
nicotine	00054-11-5

	Parameter Number
nitrofen	01836-75-5
oxydemeton-methyl	00301-12-2
paraquat	01910-42-5
parathion	00056-38-2
phorate	00298-02-2
phosazetim	04104-14-7
phosmet	00732-11-6
phosphamidon	13171-21-6
rotenone	00083-79-4
silvex, propylene glycolbutyl ether ester	02317-24-0
sodium fluoroacetate	00062-74-8
strychnine	00057-24-9
sulfallate	00095-06-7
sulfotepp	03689-24-5
TDE	00072-54-8
TEPP	00107-49-3
terbufos	13071-79-9
tetrachlorvinphos	00961-11-5
thiram	00137-26-8
toxaphene	08001-35-2
trichlorfon	00052-68-6
trichlorophenoxyacetic acid (2,4,5-T)	00093-76-5
trifluralin	01582-09-8
ziram	00137-30-4

IV. Drugs, Food Additives, Natural Materials (to be reported only by manufacturers and formulators).

	Parameter Number
actinomycin D	00050-76-0
citrus red no. 2	06358-53-8
cycasin	14901-08-7
cyclophosphamide	00050-18-0
diethylstilbestrol	00056-53-1
isonicotinic acid hydrazine	00054-85-3
lasiocarpine	00303-34-4
mestranol	00072-33-3

	Parameter Number
methylthiouracil	00056-04-2
mitomycin C	00050-07-7
monocrotaline	00315-22-0
niridazole	00061-57-4
nithiazide	00139-94-6
N-[4-(5-nitro-2-furanyl)-2-thiazolyl]acetamide	00531-82-8

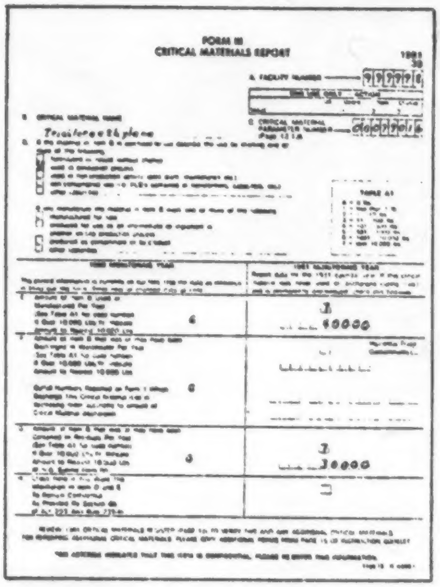
	Parameter Number
phenazopyridine hydrochloride	00136-40-3
phenesterin	03546-10-9
phenobarbitol	00050-06-6
phenytoin	00057-41-0
phenytoin sodium	00630-93-3
propylthiouracil	00051-52-5
uracil mustard	00066-75-1

* indicates new critical material

** previously included with pesticides

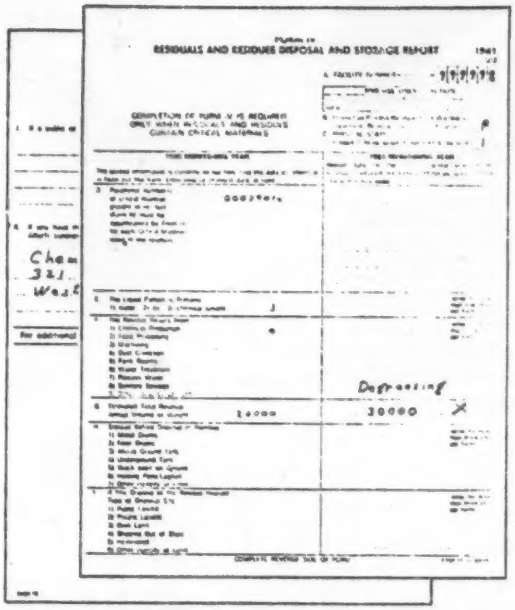
EXAMPLES OF COMPLETED FORMS III AND IV

TXT Inc. is a furniture manufacturer which uses a Critical Material. Their wastewater discharge included sanitary and process water with no Critical Materials/discharge. They use trichloroethylene in a degreasing solution. This production process residual is hauled away by a commercial waste hauler. TXT Inc. must file a completed Form III and Form IV.



FORM III
CRITICAL MATERIALS REPORT
1981

Trichloroethylene

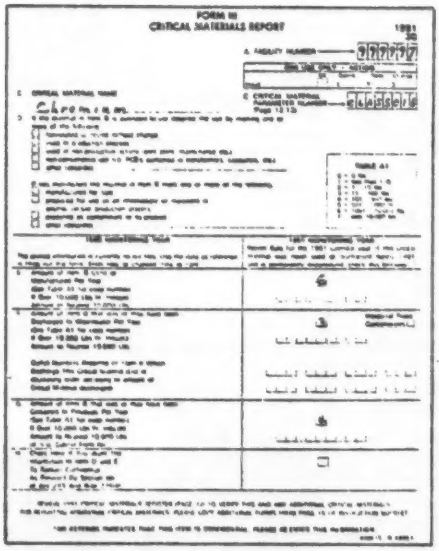


FORM IV
RESIDUALS AND RESIDUES DISPOSAL AND STORAGE REPORT
1981

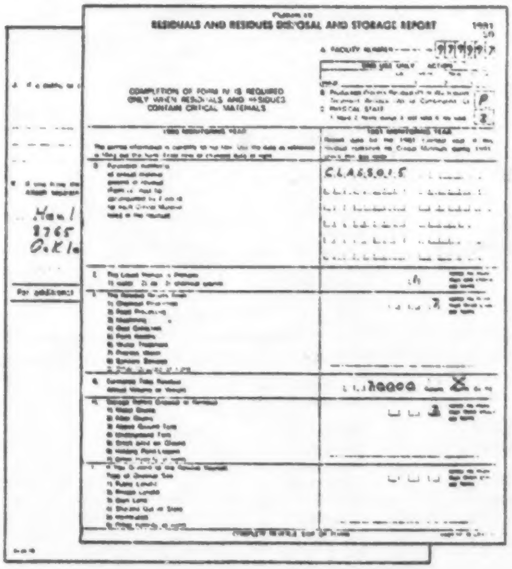
Degreasing

30000

Metalco Inc. is an electroplating firm with a chrome dip tank. Their wastewater contains process rinse water containing chromium. They also collect tank bottom settlings and dispose of these via a commercial waste hauler. Metalco Inc. must file a complete Form III and Form IV.



FORM III
CRITICAL MATERIALS REPORT
1981



FORM IV
RESIDUALS AND RESIDUES DISPOSAL AND STORAGE REPORT
1981

FORM III
CRITICAL MATERIALS REPORT

1981
30

A. FACILITY NUMBER ——→ ☐☐☐☐☐☐

DNR USE ONLY - ACTION				
	OK	Delete	New	Change
Initial	☐	1 ☐	2 ☐	3 ☐

B. CRITICAL MATERIAL NAME: ____________________

C. CRITICAL MATERIAL PARAMETER NUMBER ——→ ☐☐☐☐☐☐☐☐
(Page 12-13)

D. If the material in Item B is *purchased for use* describe the use by marking one or more of the following.

- ☐ formulated or resold without change
- ☐ used in production process
- ☐ used in non-production activity (pilot plant, maintenance etc.)
- ☐ non-consumptive use (i.e. PCB's contained in transformers, capacitors, etc.)
- ☐ other (describe) ____________________

If you *manufacture* the material in Item B mark one or more of the following.

- ☐ manufactured for sale
- ☐ produced for use as an intermediate or ingredient in another on-site production process
- ☐ produced as contaminant or by-product
- ☐ other (describe) ____________________

TABLE A1

0 = 0 lbs.
1 = less than 1 lb.
2 = 1 - 10 lbs.
3 = 11 - 100 lbs.
4 = 101 - 500 lbs.
5 = 501 - 1000 lbs.
6 = 1001 - 10,000 lbs.
7 = over 10,000 lbs.

1980 MONITORING YEAR The printed information is currently on our files. Use the data as reference in filling out the form. Enter new or changed data at right.	1981 MONITORING YEAR Report data for the 1981 calendar year. If this critical material was never used or discharged during 1981 and is permanently discontinued, check this box ——→ ☐
E. Amount of Item B Used or Manufactured Per Year (See Table A1 for code number) If Over 10,000 Lbs/Yr, Indicate Amount to Nearest 10,000 Lbs.	☐ ☐☐☐☐☐☐☐☐☐☐☐
F. Amount of Item B that was or may have been Discharged In Wastewater Per Year (See Table A1 for code number) If Over 10,000 Lbs/Yr, Indicate Amount to Nearest 10,000 Lbs.	☐ Incidental Trace Contaminants ☐ ☐☐☐☐☐☐☐☐☐☐☐
Outfall Numbers Reported on Form II Which Discharge This Critical Material (List in decreasing order according to amount of Critical Material discharged)	☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐
G. Amount of Item B that was or may have been Contained In Residuals Per Year (See Table A1 for code number) If Over 10,000 Lbs/Yr, Indicate Amount to Nearest 10,000 Lbs. (If > 0, Submit Form IV)	☐ ☐☐☐☐☐☐☐☐☐☐☐
H. Check Here If You Want The Information In Item D and E To Remain Confidential As Provided By Section 6b of Act 293 And Rule 235(4).	☐

REVIEW 1981 CRITICAL MATERIALS REGISTER (PAGE 12) TO VERIFY THIS AND ANY ADDITIONAL CRITICAL MATERIALS.
FOR REPORTING ADDITIONAL CRITICAL MATERIALS, PLEASE COPY ADDITIONAL FORMS FROM PAGE 15 OF INSTRUCTION BOOKLET.

***AN ASTERISK INDICATES THAT THIS ITEM IS CONFIDENTIAL; PLEASE RE-ENTER THIS INFORMATION.**

R 4888-6

INSTRUCTIONS FOR FORM IV

GUIDELINES FOR RESIDUAL REPORTING

Residuals and Residues are the final waste substances remaining for disposal after wastewater treatment or production process activity involving any Critical Material(s). Residuals and Residues receive no further processing or treatment by you. They must either be disposed of or stored for eventual disposal. They are not discharged in wastewater.

Typical residuals include but are not limited to:

- liquid or semi-liquid sludges
- dry or partially dry filter cake after liquid removal
- waste oils (lubricating and cooling)
- waste solvents not reprocessed on site
- still residues
- chemical reaction vessel residues
- wet or dry dust involving any Critical Material (pages 12 and 13)

COMPLETION OF FORM IV

I. Completion of Form IV is required **only when** residuals and residues contain Critical Materials (example below).

A completed Form IV must be accompanied by a completed Form III for each Critical Material listed in the residual.

II. To report more than one residual, Form IV (page 17) may be duplicated.

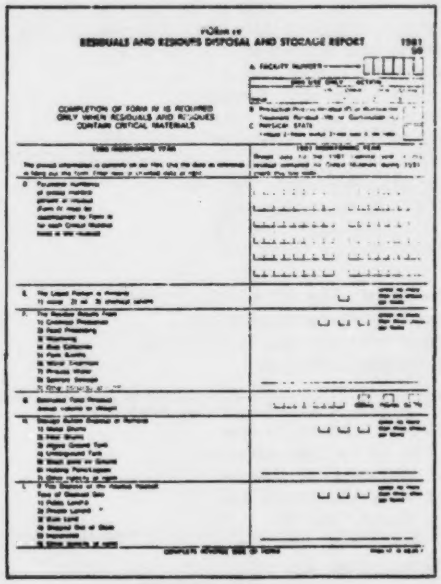
Part A — Copy six digit facility identification code from mailing label.

Part B — Indicate the residual source by appropriate letter code.

Part C — Indicate the physical state of the residue by appropriate number code.

Parts D, E, F, G, H, I — Complete the following statements in regards to residue by appropriate number code.

Parts J, K — Provide written answers to following statements, if appropriate (see reverse side of Form IV).



EXAMPLE FORM IV

Please provide completed Form IV's for all residues, regardless of information submitted with 1980 report.

Additional examples on Page 14.

FORM IV
RESIDUALS AND RESIDUES DISPOSAL AND STORAGE REPORT

1981
50

A. FACILITY NUMBER ⟶ ☐☐☐☐☐☐

DNR USE ONLY - ACTION				
	OK	Delete	New	Change
Initial	☐	1. ☐	2. ☐	3. ☐

COMPLETION OF FORM IV IS REQUIRED
ONLY WHEN RESIDUALS AND RESIDUES
CONTAIN CRITICAL MATERIALS

B. Production Process Residual (P) or Wastewater Treatment Residual (W) or Combination (C) ☐

C. PHYSICAL STATE
1=liquid 2=heavy sludge 3=wet solid 4=dry solid ☐

1980 MONITORING YEAR	**1981 MONITORING YEAR**
The printed information is currently on our files. Use the data as reference in filling out the form. Enter new or changed data at right.	Report data for the 1981 calendar year. If this residual contained no Critical Materials during 1981, check this box ⟶ ☐
D. Parameter number(s) of critical material present in residual (Form IV must be accompanied by Form III for each Critical Material listed in the residual)	
E. The Liquid Portion is Primarily 1) water 2) oil 3) chemical solvent	☐ (enter no more than one choice per form)
F. The Residue Results From 1) Chemical Production 2) Food Processing 3) Machining 4) Dust Collection 5) Paint Booths 6) Water Treatment 7) Process Water 8) Sanitary Sewage 9) Other (describe at right)	☐ ☐ ☐ (enter no more than three choices per form) ________________
G. Estimated Total Residual Annual Volume or Weight	☐ Gallons ☐ Pounds ☐ Cu. Yd.
H. Storage Before Disposal or Removal 1) Metal Drums 2) Fiber Drums 3) Above Ground Tank 4) Underground Tank 5) Stock piled on Ground 6) Holding Pond/Lagoon 7) Other (specify at right)	☐ ☐ ☐ (enter no more than three choices per form) ________________
I. If You Dispose of the Residue Yourself, Type of Disposal Site 1) Public Landfill 2) Private Landfill 3) Own Land 4) Shipped Out of State 5) Incinerated 6) Other (specify at right)	☐ ☐ ☐ (enter no more than three choices per form) ________________

COMPLETE REVERSE SIDE OF FORM

R 4888-7

J. If a public or private landfill(s) is used give the name(s) and location(s). Attach separate list if necessary.

K. If you have the material removed by commercial waste or refuse hauler(s) give the name(s) and address(es). Attach separate list if necessary.

For additional residuals, please copy additional forms from page 17 of instruction booklet

FOLD HERE SECOND

PLACE
FIRST CLASS
STAMP
HERE

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ACT 293 REPORTS
P.O. BOX 30033
LANSING, MICHIGAN 48909

FOLD HERE FIRST

MAILING INSTRUCTIONS: FOLD THIS RETURN AROUND ALL FORMS BEING RETURNED. BE SURE TO WRITE IN YOUR RETURN ADDRESS AND APPLY SUFFICIENT POSTAGE. STAPLE AND MAIL.

HOW SURVEILLANCE FEES ARE CALCULATED

Surveillance Fees are determined by applying the following formula.

SURVEILLANCE FEE = ADMINISTRATIVE FEE + (VOLUME BASE FEE x SURVEY FACTOR).

I. Administrative Fee = $50.00

II. Volume Base Fee is determined from the total of the average daily discharges of all outfalls (based on days when discharge occurs).

This total volume excludes:

a. Discharges of waste to a sanitary sewer unless the discharge is likely to create injuries to the waters of the State.

b. Discharges of sanitary waste to a septic tank-tile field system, unless the discharge requires surveillance by the Water Resources Commission.

III. The Survey Factor is determined for each outfall from the following subfactors which are weighted as indicated.

		Minimum Value	Maximum Value
a. Variability =	$\frac{\text{Outfall Maximum Daily Flow}}{\text{Outfall Average Daily Flow}}$	1	5
b. Dilution =	$\frac{\text{Outfall Average Daily Flow}}{\text{(0.1) (7-day, 10-yr. drought flow)}}$	0	10
c. Designated use of the receiving water[1]		4	20
d. Category I waste constituents, 2xN [2]		0	None
e. Category II waste constituents, 4xN [2]		0	None
f. Category III waste constituents, 8xN [2]		0	None
g. Critical material factor[3]		0	10
h. Latest rating of facility waste control[4]		0	15
i. Provisions for accident prevention		0	5
j. Number of outfalls, 2xN		0	None
k. Difficulty of waste survey		0	10
l. Intensity of area surveillance		0	10

[1] Designated uses are as follows: Domestic water supply — 20 points; Coldwater fish intolerant species — 20 points; Recreation total body contract — 16 points; Warm water fish intolerant species — 12 points; Industrial water supply — 8 points; Commercial — 4 points.

[2] Categories of typical waste constituents are listed on page 21.

[3] Critical materials are listed on pages 12 & 13.

[4] Ratings are as follows: Adequate waste control — 0 points; Inadequate waste control — 15 points.

An *Outfall Survey Factor* for each outfall is determined by totaling the points assigned each subfactor and dividing the total by 10. No outfall survey factor will be less than 1.0.

An *Adjusted Survey Factor* for each outfall is determined by multiplying the outfall survey factor by the ratio of outfall Average Daily Flow/Total Plant Average Daily Flow.

A *Proportional Survey Factor* for the entire facility is determined by totaling the adjusted survey factors.

The surveillance fee is then calculated by multiplying the *Volume Base Fee* by the *Proportional Survey Factor* and adding the *Administrative Fee* of $50.

An adjustment factor will be used to adjust the total of all fees to the legislative appropriation.

TYPICAL WASTE CONSTITUENTS

Category I

01. Temperature
02. pH
03. Conductivity
04. Color
05. Turbidity

09. Other

Category II

10. Alkalinity
11. Hardness
12. Acidity
13. DO
14. BOD
15. Ammonia
16. Nitrate
17. Soluble Ortho-P04

Major Ions-

18. Sodium
19. Potassium
20. Magnesium
21. Calcium
22. Chloride
23. Sulfate
24. Sulfide

Solids-

25. Total Solids
26. Suspended Solids
27. Settleable Solids
28. Dissolved Solids
29. Susp. Volatile Solids

Radioactivity-

30. Alpha Radiation
31. Beta Radiation
32. Gamma Radiation

Minor Ions-

33. Bromide
34. Sulfite
35. Boron
36. Silicon
37. Nitrite
38. Oil and Grease
39. Organic Extractibles
40. Anionic Surfactants
41. Chlorine

49. Other

Category III

50. Total Phosphorus
51. Kjeldahl Nitrogen
52. Phenol
53. Cyanide
54. TOC
55. COD

Bacteria-

56. Total Coliform
57. Fecal Coliform
58. Fecal Streptococcus

Heavy Metals-

59. CR+6
60. Cu
61. Zn
62. Cd
63. Pb
64. Hg
65. Se
66. Ag
67. Fe
68. Mn
69. Ni
70. Al
71. Sb
72. Ba
73: Be
74. Co
75. Mo
76. Tl
77. Sn
78. Ti
79. Cr+3

80. Arsenic
81. Fluoride
82-86. Specific Radionuclides
87-91. Pesticides, PCB's Chlorinated Hydrocarbons
92-97. Specific Organic Compounds
98-99. Other

Typical waste constituents are categorized by the relative expense of performing the analyses and sample collection requirements. Changes and additions may be made to this list.

STATE OF MICHIGAN

Sections 6b of
Act 293, Public Acts of 1972

AN ACT to amend the title and sections 6, 7, 8 and 10 of Act No. 245 of the Public Acts of 1929, entitled as amended . . .

Sec. 6b. Every person, doing business within this state discharging waste water to the waters of the state or to any sewer system, which contains wastes in addition to sanitary sewage shall file annually reports on forms provided by the commission setting forth the nature of the enterprise, a list of materials used in and incidental to its manufacturing processes and including by-products and waste products, which appear on a register of critical materials as compiled by the commission with the advice of an advisory committee of environmental specialists designated by the commission and the estimated annual total number of gallons of waste water including but not limited to process and cooling water to be discharged to the waters of the state or to any sewer system. The information shall be used by the commission only for purposes of water pollution control. The commission shall provide proper and adequate facilities and procedures to safeguard the confidentiality of manufacturing proprietary processes except that confidentiality shall not extend to waste products discharged to the waters of the state. Operations of a business or industry which violate this section may be enjoined on petition of the water resources commission to a court of proper jurisdiction. The commission shall promulgate rules as it deems necessary to effectuate the administration of this section, including where necessary to meet special circumstances, reporting more frequently than annually.

STATE OF MICHIGAN

Section 13 of Act 116
Public Acts of 1981

Sec. 13. (1) In order to provide for increased surveillance, investigation, monitoring, and other activities necessary to provide greater protection of the quality of waters of this state, an annual surveillance fee is payable by a person, company, corporation, but not a municipality, that discharges water-borne waste directly or indirectly into the waters of this state from a manufacturing facility; or from any other commercial establishment that generates a discharge inconsistent with the protection of waters of this state. The fee shall be for the cost of surveillance of industrial and commercial discharges and receiving waters. The cost of necessary surveillance of municipal discharges shall not be financed from annual surveillance fees, but may be financed as otherwise provided by law. The total surveillance fees assessed annually on discharges shall not exceed the total amount appropriated to the commission or other appropriate state agency. Surveillance fees shall be restricted to:

(a) Surveillance, inspection, and pollution prevention including necessary data collection, compliance sampling and analysis directly related to the operations of the fee payers in the aggregate.

(b) Evaluation and issuance of permits to surveillance fee payers.

(c) Administrative support, including laboratory, sampling and monitoring equipment directly related to the dischargers who pay surveillance fees in the aggregate.

(2) Before February 2, of each year the commission shall inform each discharger and the state treasurer of the annual surveillance fee due from each plant location or major manufacturing component and commercial enterprise, as provided by rule. Except as provided in subsection (6), if notice is not made before February 2 in any year, the surveillance fee shall remain the same as the previous year. High quality agricultural wastewater, which is not discharged directly into a lake or stream but is diverted in accordance with an approved agromanagement plan for irrigation at a rate which approximates the rate of plant uptake and results from normal agricultural operations such as cooling, heating, washing, conveying, transporting, or holding fruit or vegetables shall be exempt from the surveillance fee.

(3) Before March 2 of each year a discharger shall pay to the state treasurer the amount of surveillance fee due. The state treasurer shall deposit the fee in the general fund of this state. The treasurer shall report the total amount collected to the governor and the legislature before April 16 of each year.

(4) The annual surveillance fee shall be based on an administrative fee of $50.00 and an additional fee set by the commission. The additional fee shall be determined on a graduated basis using a formula developed by rules of the commission promulgated pursuant to Act No. 306 of the Public Acts of 1969, as amended, being sections 24.201 to 24.315 of the Michigan Compiled Laws. The formula shall include the volume and nature of discharge, number of discharge locations, variability of flow volume, stream characteristics, required laboratory tests, area surveillace, difficulty of survey setup, history of compliance and provisions for compliance, and other factors that the commission considers appropriate to establish the total amount surveillance fee. The maximum annual fee assessed shall not exceed $18,000.00 per manufacturing location. For the fiscal year beginning October 1, 1980, the legislative appropriations conversion factor, which is used to match the total surveillance fee billings with the authorized appropriation, shall not exceed 5.80. A discharger shall not be assessed a fee if the total fee calculated by the formula is $50.00 or less. A discharge into a municipal sewerage system shall be assessed only the $50.00 administrative fee. However, if the discharge, after municipal treatment, is or will become injurious to the waters of this state under section 6, the assessment will be based upon the same consideration as if the discharge, after treatment, were being discharged by the manufacturing facility or commercial establishment directly into the waters of this state. The commission shall promulgate rules necessary to implement this section.

(5) The total surveillance fees assessed annually shall not exceed the total amount appropriated to the department of natural resources or other appropriate state or local agency for surveillance. The total amount of revenue generated annually by water pollution surveillance fees shall not comprise more than 41% of the total funding support from all sources for the fiscal year beginning October 1, 1980, 30% for the fiscal year beginning October 1, 1981, 20% for the fiscal year beginning October 1, 1982, 10% for the fiscal year beginning October 1, 1983, and 0% for the fiscal year beginning October 1, 1984 and thereafter, as appropriated by the legislature, of the state water pollution control and abatement programs authorized by this act. All surveillance fees shall be reduced each year by a percentage equal to the percentage by which total surveilance fees are reduced from the previous fiscal year pursuant to this subsection.

(6) For the year 1981 only, the commission shall inform a discharger and the state treasurer of the annual surveillance fee due from each plant location or major manufacturing component and commercial enterprise, as provided by rule not later than 2 weeks after the effective date of this subsection. For the year 1981 only, a discharger shall pay to the state treasurer the amount of surveillance fees due not later than 6 weeks after the effective date of this subsection.

Note: Copies of Act No. 245, P.A. 1929 are available from the Michigan Department of Natural Resources upon request. Copies of Part 9 Rules: Wastewater Reporting and Surveillance Fees are also available upon request.

APPENDIX C

Computer Programs

SDM/70

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DATE	2/1/82
PAGE	

SYSTEM TITLE	TSCA	PART	
PHASE	Productional Design	SECTION	

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II. Selective Reporting

Introduction C-16
Data Base Retrieval and Sort C-17
Print CMR Master Listing C-22
Print CMR Mailing List Report C-30
C.M.R. Statistical Report C-37

III. Hazard Assessment

Introduction C-45
Build Hazard Assessment File C-46
Print Hazard Assessment File C-55
Hazard Assessment Reorganization C-63

IV. Priority Ranking

Introduction C-68
Build Wastewater Transactions C-71
Update Wastewater Master C-81
Merge and Edit C-88
Priority Ranking Calculator C-95
Print Facility Hazard Priority Report C-100

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2-1-82

SYSTEM TITLE	TSCA	PART	Introduction
PHASE	Productional Design	SECTION	Overview

To support the data processing needs of the Toxic Substance Control Act Cooperative Agreement, three individual systems were developed:

1. Selective Reporting - allows printing of information based on a wide field of selection options and data presentation sequences.

2. Hazard Assessment - provides on-line maintenance and selective retrieval printing for chemical materials being researched and evaluated by the department.

3. Priority Ranking - using a scoring process, selected facilities and Wastewater Treatment Plants are evaluated and ranked based on their potential for causing environmental damage.

All facilities are required to report any use and discharge of critical materials in addition to other information about their operating activities. This information is processed outside of the TSCA computer programs by the Water Surveillance Fee System. Data files maintained by this process serve as the primary root for activities performed by the TSCA systems. A brief description of the Water Surveillance Fee System is provided in this part.

All operations for this system are executed on Burrough's B-7700 series computer using version 3.1 of the Burroughs system software package. Minor patches have been installed to this software to conform with site standards and procedures. Report printed is done using Burroughs B-9270 35 Page Printer.

It is the intent to include in this appendix a detailed overview of the TSCA computer systems implemented to meet the processing objectives. Any requests for additional information should be directed to the following address:

Michigan Department of Natural Resources
Data Center
P.O. Box 30028
Lansing, MI 48909

Phone (517) 373-9510

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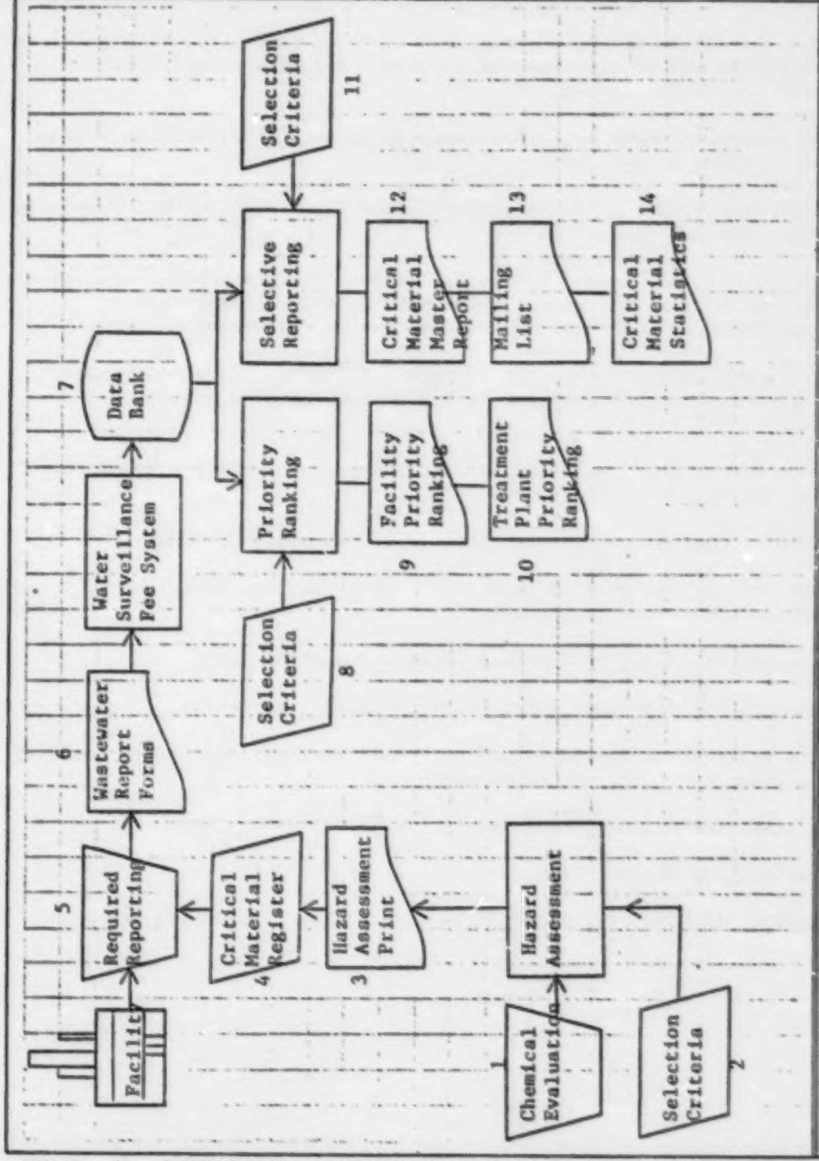
	SDM/70 CHART OR TABLE FORM	**PROJECT NUMBER**	G584
		DATE	2-1-82
		PAGE	

SYSTEM TITLE TSCA	**PART** Introduction
PHASE Productional Design	**SECTION** Functional Flow Chart



Facility
Required Reporting
5
Wastewater Report Forms
6
Water Surveillance Fee System
Data Bank
7
Selective Reporting
Selection Criteria
11
Critical Material Master Report
12
Mailing List
13
Critical Material Statistics
14
Priority Ranking
Selection Criteria
8
Facility Priority Ranking
9
Treatment Plant Priority Ranking
10
Chemical Evaluation
1
Selection Criteria
2
Hazard Assessment
Hazard Assessment Print
3
Critical Material Register
4

NOTES

Refer to page C-4 for descriptions of referencing points.

SDM-101

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SDM/70

GENERAL DOCUMENTATION FORM

PROJECT NUMBER G584

DATE 2-1-82

SYSTEM TITLE TSCA

PART Introduction

PHASE Productional Design

SECTION Functional Flow Chart

1. Ongoing chemical evaluation is done using a point system for rating numerous properties of each chemical. Study results are loaded into the Hazard Assessment System.
2. Based on reporting needs selection criteria is determined and the Hazard Assessment report is generated.
3. The Hazard Assessment report is produced annually containing all chemicals which have been evaluated.
4. Annually the Critical Material Register is produced and submitted to all reporting facilities. Chemicals which make up this register are determined based on point values assigned during evaluation.
5. Annually, facilities are required to report discharge chemicals listed on the Critical Material Register indicate which chemicals must be reported.
6. Wastewater Report Forms are completed by the facility and processed thru the Water Surveillance Fee System.
7. Information is stored for a retention age of two years on disk.
8. Selection criteria is entered into the Priority Ranking System based on need and intended use of the requestor.
9. If requested, the Facility Priority Ranking Report is produced.
10. If requested, the Treatment Plant Priority Ranking Report is produced.
11. Selection criteria is entered into the Selective Reporting System based on need and intended use of the requestor.
12. If requested, the Critical Material Master Report is produced.
13. If requested, the Mailing List is produced.
14. If requested, the Critical Material Statistics Report is produced.

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2-1-82

SYSTEM TITLE TSCA

PART Introduction

PHASE Productional Design

SECTION Water Surveillance Fee System

WATER SURVEILLANCE FEE SYSTEM

The Water Surveillance Fee System is responsible for data base maintenance, fee calculation, fee calculation, error checking, reporting, bill printing and utility functions associated with assessment of surveillance fees.

A data base of industrial and commercial establishments that may have a wastewater discharge has been compiled. All firms are sent an annual reporting booklet from which they file appropriate forms documenting discharge during the calender year. Incoming documents are reviewed and used to update the data base. Key-disk records are prepared from actual reports filed by the respondents. The update process is executed as the need exists.

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SDM/70

DETAIL FILE DESCRIPTION

PROJECT NUMBER: G584

DATE: 2/1/82

SYSTEM TITLE: TSCA	PART: Introduction
PHASE: Productional Design	SECTION: Water Surveillance Fee System

IDENTIFICATION

ITEM NO: 1	DB FILE NAME: OUTFALL FILE	FILE NO.: C/602/OUTFALL
COPYLIB NAME:	DD NAME: OUTFALL-FILE	DS NAME:
FILE USAGE:		

DESCRIPTION

TYPE	☒ DISC PACK ☐ SINGLE PACK ☐ MULTIPLE PACK	☐ TAPE ☐ SINGLE REEL ☐ MULTIPLE REEL	☐ OTHER
FILE ORGANIZATION	☐ SEQUENTIAL ☐ DIRECT	☐ INDEX SEQUENTIAL ☒ OTHER RANDOM	
ACCESS METHOD	☐ BSAM ☐ VSAM	☐ BDAM ☐ ISAM	☒ OTHER RANDOM
INTERNAL LABELS	☒ STANDARD	☐ NONE	☐ OTHER
DCB PARAMETERS	BLKSIZE: 360 LRECL: 120	RECFM: SPACE:	
RETENTION CYCLE	☒ DAYS:	☐ GENERATIONS:	UPDATE INTERVAL:

FILE SIZE

NO. OF RECORDS	RECORDS IN START-UP FILE: 7200 NEW RECORDS ADDED: N/A GROWTH RATE IS PER: ☐ DAY ☐ WEEK ☐ MONTH ☒ UP-DATE CYCLE
RECORD LENGTH	120 CHARACTERS ☐ FIXED LENGTH ☐ VARIABLE LENGTH ☐ UNDEFINED:

FILE SEQUENCE

KEY IDENTIFICATION

MAJOR ↓ MINOR

ELEM. NO	DATA ELEMENT NAME	*

*SUB KEY INDICATOR
P PRIMARY
S SECONDARY

KEY LENGTH: ______

KEY NAME: ______

FILE USAGE

OUTPUT FROM PROGRAM

SYSTEM NO	PROGRAM NO.
602	01

CONTENT

INPUT TO PROGRAMS

SYSTEM NO	PROGRAM NO
584	01
584	02
584	16

SDM-302 [illegible]

WORKFILE: SURV/FD/OUTFALL (12/18/79) [COBOL]

```
10000    FD  OUTFALL-FILE
10100        BLOCK CONTAINS 3 RECORDS;
10200        RECORD CONTAINS 120 CHARACTERS;
10300        VALUE OF ID IS "G"/"602"/"OUTFALL";
10400        SAVE-FACTOR IS 120;
10500        DATA RECORD IS OUTFALL-RECORD.
10600
10700    01  OUTFALL-RECORD SIZE 120.
10800        03  OR-IDENTIFICATION SIZE 12.
10900            05  OR-FACILITY-NUMBER        PIC 9(6).
11000            05  OR-OUTFALL-NUMBER         PIC 9(6).
11100        03  OR-TYPE-CODE                  PIC 9.
11200        03  OR-AVG-DAILY-FLOW             PIC 9(3)V9(4).
11300        03  OR-MAXIMUM-DAILY-FLOW         PIC 9(3)V9(4).
11400        03  OR-TOTAL-ANNUAL-FLOW          PIC 9(6)V9.
11500        03  OR-PERCENT-PROCESS            PIC 9(3).
11600        03  OR-PERCENT-COOLING            PIC 9(3).
11700        03  OR-PERCENT-SANITARY           PIC 9(3).
11800        03  OR-DROUGHT-FLOW               PIC 9(6).
11900        03  OR-CRITICAL-MATERIAL          PIC X.
12000        03  OR-DIFFICULTY-SURVEY          PIC 99.
12100        03  OR-INTENSIVE-SURVEY           PIC X.
12200        03  OR-DESIGNATED-USE             PIC XX.
12300        03  OR-VARIABILITY                PIC 9(3)V99.
12400        03  OR-DILUTION                   PIC 99V99.
12500        03  OR-NUMBER-I                   PIC 99.
12600        03  OR-NUMBER-II                  PIC 99.
12700        03  OR-NUMBER-III                 PIC 99.
12800        03  OR-SURVEY-FACTOR              PIC 99V99.
12900        03  OR-PROPORTIONALITY-CONSTANT PIC 9V9(4).
13000        03  OR-ADJUSTED-SURVEY-FACTOR     PIC 99V99.
13100        03  OR-CALCULATION-WORK-AREA SIZE 6.
13200            05  OR-SURVEY-COMPUTED-FLAG PIC 9.
13300            05  OR-SURVEY-FACTOR-POINTS PIC 9(3)V99.
13400        03  OR-GPSF-NUMBER                PIC 9(3).
13410        03  FILLER                        PIC X(13).
13500        03  OR-LINK-DATA SIZE 15.
13600            05  OR-FACILITY-LINK          PIC 9(5).
13700            05  OR-PARAM-LINK             PIC 9(5).
13800            05  OR-NEXT-OUTFALL-LINK      PIC 9(5).
13900
```

	SDM/70 DETAIL FILE DESCRIPTION	PROJECT NUMBER: G584 DATE: 2/1/82

SYSTEM TITLE T.S.C.A.	**PART** Introduction
PHASE Productional Design	**SECTION** Water Surveillance Fee System

IDENTIFICATION

ITEM NO 2	DB FILE NAME CRITICAL-FILE	FILE NO. G/602/CRITICAL
COPYLIB NAME	DD NAME CRITICAL-FILE	DS NAME
FILE USAGE		

DESCRIPTION

TYPE	☒ DISC PACK ☐ SINGLE PACK ☐ MULTIPLE PACK	☐ TAPE ☐ SINGLE REEL ☐ MULTIPLE REEL	☐ OTHER
FILE ORGANIZATION	☐ SEQUENTIAL ☐ DIRECT	☐ INDEX SEQUENTIAL ☒ OTHER	
ACCESS METHOD	☐ BSAM ☐ VSAM	☐ BDAM ☐ ISAM	☒ OTHER RANDOM
INTERNAL LABELS	☒ STANDARD	☐ NONE	☐ OTHER
DCB PARAMETERS	BLKSIZE: 1440 LRECL: 480	RECFM: SPACE:	
RETENTION CYCLE	☒ DAYS:	☐ GENERATIONS:	UPDATE INTERVAL:

FILE SIZE

NO. OF RECORDS	RECORDS IN START-UP FILE: 5700 NEW RECORDS ADDED: N/A GROWTH RATE IS PER: ☐ DAY ☐ WEEK ☐ MONTH ☒ UP-DATE CYCLE
RECORD LENGTH	480 CHARACTERS ☐ FIXED LENGTH ☐ VARIABLE LENGTH ☐ UNDEFINED:

FILE SEQUENCE

KEY IDENTIFICATION

MAJOR ↓ MINOR

ELEM NO.	DATA ELEMENT NAME	*

*SUB KEY INDICATOR
P PRIMARY
S SECONDARY

KEY LENGTH: ______

KEY NAME: ______

FILE USAGE

OUTPUT FROM PROGRAM

SYSTEM NO	PROGRAM NO.
602	01

CONTENT

INPUT TO PROGRAMS

SYSTEM NO	PROGRAM NO.
584	01
584	02
584	04
584	16

SDM-302

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WORKFILE: SURV/FD/CRITICAL/80 (04/10/80) [COBOL]

```
10000     FD  CRITICAL-FILE
10100          BLOCK CONTAINS 3 RECORDS
10200          RECORD CONTAINS 480 CHARACTERS
10300          VALUE OF ID IS "G"/"602"/"CRITICAL"
10400          SAVE-FACTOR IS 99
10500          DATA RECORD IS CRITICAL-MATERIAL-RECORD.
10600
10700     01  CRITICAL-MATERIAL-RECORD.
10800          05  CM-IDENTIFICATION.
10900              10  CM-FACILITY-NUMBER      PIC 9(6).
11000          05  CM-CRITICAL-DATA            PIC X(378).
11100          05  CM-CRITICAL-ENTRY REDEFINES CM-CRITICAL-DATA OC 7 TIM
11200              10  CM-MATERIAL-CODE        PIC X(8).
11300              10  CM-CONFIDENTIAL         PIC X.
11400              10  CM-USED-CODE            PIC 9.
11500              10  CM-DISCHARGE-CODE       PIC 9.
11600              10  CM-RESIDUAL-DISCHARGE   PIC 9.
11610              10  CM-USED-AMT             PIC 9(9).
11620              10  CM-DISCHARGE-AMT        PIC 9(9).
11630              10  CM-RESIDUAL-AMT         PIC 9(9).
11700              10  CM-GPSF-DISCHARGE       PIC X(15).
11800          05  FILLER                      PIC X(86).
11900          05  CM-LINK-DATA.
12000             10  CM-FACILITY-LINK       PIC 9(5).
12100             10  CM-NEXT-MATERIAL-LINK  PIC 9(5).
```

SDM/70

DETAIL FILE DESCRIPTION

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE	T.S.C.A.
PHASE	Productional Design
PART	Introduction
SECTION	Water Surveillance Fee System

IDENTIFICATION

ITEM NO. 3

DB FILE NAME FACILITY FILE

FILE NO. G/602/FACILITY

COPYLIB NAME

DD NAME FACILITY-FILE

DS NAME

FILE USAGE

DESCRIPTION

TYPE	☒ DISC PACK ☐ SINGLE PACK ☐ MULTIPLE PACK	☐ TAPE ☐ SINGLE REEL ☐ MULTIPLE REEL	☐ OTHER
FILE ORGANIZATION	☒ SEQUENTIAL ☐ DIRECT	☐ INDEX SEQUENTIAL ☐ OTHER	
ACCESS METHOD	☐ BSAM ☐ VSAM	☐ BDAM ☐ ISAM	☒ OTHER SEQUENTIAL
INTERNAL LABELS	☒ STANDARD	☐ NONE	☐ OTHER
DCB PARAMETERS	BLKSIZE: 1260 LRECL: 210	RECFM: SPACE:	
RETENTION CYCLE	☒ DAYS:	☐ GENERATIONS:	UPDATE INTERVAL:

FILE SIZE

NO. OF RECORDS

RECORDS IN START-UP FILE: 20,000

NEW RECORDS ADDED: N/A

GROWTH RATE IS PER: ☐ DAY ☐ WEEK ☐ MONTH ☒ UP-DATE CYCLE

RECORD LENGTH

210 CHARACTERS ☒ FIXED LENGTH ☐ VARIABLE LENGTH ☐ UNDEFINED:

FILE SEQUENCE

KEY IDENTIFICATION

MAJOR

↓

MINOR

ELEM. NO	DATA ELEMENT NAME	*

*SUB KEY INDICATOR
P PRIMARY
S SECONDARY

KEY LENGTH: ______

KEY NAME: ______

FILE USAGE

OUTPUT FROM PROGRAM

SYSTEM NO	PROGRAM NO.
602	01

CONTENT

INPUT TO PROGRAMS

SYSTEM NO	PROGRAM NO
584	01,02
584	03,04
584	10,11
584	12

SDM-302

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WORKFILE: SURV/FD/FACILITY/80 (06/16/80) [COBOL]

```
10000     FD  FACILITY-FILE
10100         BLOCK CONTAINS 6 RECORDS;
10200         RECORD CONTAINS 210 CHARACTERS;
10300         VALUE OF ID IS "G"/"602"/"FACILITY";
10400         SAVE-FACTOR IS 120;
10500         DATA RECORD IS FACILITY-RECORD.
10600
10700     01  FACILITY-RECORD SIZE 210.
10800         03  FR-IDENTIFICATION SIZE 6.
10900             05  FR-FACILITY-NUMB          PIC 9(6).
11000             05  FR-FACILITY-NUMBER REDEFINES FR-FACILITY-NUMB.
11100                 07  FR-FACILITY-COUNTY    PIC 99.
11200                 07  FR-FACILITY-SEQUENCE  PIC 9(4).
11300         03  FR-AIR-ESTAB-NUMBER           PIC X(5).
11400         03  FR-FACILITY-ADDRESS SIZE 114.
11500             05  FR-FACILITY-NAME          PIC X(30).
11600             05  FR-FACILITY-ATTENTION     PIC X(30).
11700             05  FR-FACILITY-STREET        PIC X(30).
11800             05  FR-FACILITY-CITY          PIC X(17).
11900             05  FR-FACILITY-STATE         PIC XX.
12000             05  FR-FACILITY-ZIP           PIC 9(5).
12100         03  FR-DISTRICT                   PIC 9.
12200         03  FR-FEE-APPLICABILITY          PIC X.
12300         03  FR-NUMBER-OUTFALLS            PIC 99.
12400         03  FR-SIC-CODE SIZE 4.
12410             05  FR-SIC-PREFIX             PIC XX.
12420             05  FR-SIC-SUFFIX             PIC XX.
12500         03  FR-ANNUAL-RATING              PIC X.
12600         03  FR-ACCIDENT-PREVENTION-PLAN   PIC X.
12700         03  FR-VOLUME-BASE-FEE            PIC 9(4)V99.
12800         03  FR-TOTAL-AVG-DAILY-DISCH      PIC 9(4)V9(4).
12900         03  FR-PROPORTIONAL-SURVEY-FACTOR PIC 999V99.
13200         03  FR-FEE-DUE                    PIC 9(5)V99.
13600         03  FR-RELIABILITY-CHECK-FLAG     PIC 9.
13700         03  FR-MAJOR-DISCHARGE            PIC X.
13710         03  FR-COUNTY-CODE                PIC 99.
13715         03  FR-SANITARY-SEWER             PIC 9(6).
13720         03  FR-EMPLOYER-NUMBER SIZE 9.
13721             05  FR-EMPLOYER-PREFIX        PIC 99.
13722             05  FR-EMPLOYER-SUFFIX        PIC 9(7).
13725         03  FR-RIVER-BASIN.
13727             05  FR-MAJOR-MINOR.
13730                 07  FR-MAJOR-RIVER            PIC 99.
13735                 07  FR-MINOR-RIVER            PIC 99.
13740             05  FR-TERMINAL-STREAM        PIC 999.
13742         03  FR-RESPONDENT-FLAG            PIC 9.
13750         03  FILLER                        PIC XX.
13800         03  FR-LINK-DATA SIZE 20.
13850             05  FR-RESIDUAL-LINK          PIC 9(5).
13900             05  FR-OUTFALL-LINK           PIC 9(5).
14000             05  FR-CRITICAL-LINK          PIC 9(5).
14100             05  FR-NEXT-FACIL-LINK        PIC 9(5).
14200
```

SDM/70

DETAIL FILE DESCRIPTION

PROJECT NUMBER: G584
DATE: 2/1/82

SYSTEM TITLE: T.S.C.A.
PART: Introduction
PHASE: Productional Design
SECTION: Water Surveillance Fee System

IDENTIFICATION

ITEM NO.: 4
DB FILE NAME: RESIDUAL-FILE
FILE NO.: G/602/RESIDUAL
COPYLIB NAME:
DD NAME: RESIDUAL-FILE
DS NAME:
FILE USAGE:

DESCRIPTION

TYPE	☒ DISC PACK ☐ SINGLE PACK ☐ MULTIPLE PACK	☐ TAPE ☐ SINGLE REEL ☐ MULTIPLE REEL	☐ OTHER
FILE ORGANIZATION	☐ SEQUENTIAL ☐ DIRECT	☐ INDEX SEQUENTIAL ☒ OTHER RANDOM	
ACCESS METHOD	☐ BSAM ☐ VSAM	☐ BDAM ☐ ISAM	☒ OTHER RANDOM
INTERNAL LABELS	☒ STANDARD	☐ NONE	☐ OTHER
DCB PARAMETERS	BLKSIZE: 360 LRECL: 120	RECFM: SPACE:	
RETENTION CYCLE	☒ DAYS:	☐ GENERATIONS:	UPDATE INTERVAL:

FILE SIZE

NO. OF RECORDS: RECORDS IN START-UP FILE: 2500 NEW RECORDS ADDED N/A
GROWTH RATE IS PER: ☐ DAY ☐ WEEK ☐ MONTH ☒ UP-DATE CYCLE
RECORD LENGTH: 120 CHARACTERS ☐ FIXED LENGTH ☐ VARIABLE LENGTH ☐ UNDEFINED.

FILE SEQUENCE

KEY IDENTIFICATION

MAJOR ↓ MINOR

ELEM. NO	DATA ELEMENT NAME	*

*SUB KEY INDICATOR
P PRIMARY
S SECONDARY

KEY LENGTH: ______
KEY NAME: ______

FILE USAGE

OUTPUT FROM PROGRAM

SYSTEM NO	PROGRAM NO
602	01

CONTENT

INPUT TO PROGRAMS

SYSTEM NO	PROGRAM NO
584	01
584	02

SDM-302

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WORKFILE: SURV/FD/RESIDUAL (06/08/78) [COBOL]

```
  1700     FD  RESIDUAL-FILE
  1800        BLOCK CONTAINS 3 RECORDS
  1850        SAVE-FACTOR IS 120
  1900        VALUE OF ID IS "G"/"602"/"RESIDUAL".
  2000        01  RESIDUAL-RECORD SIZE 80.
  2200            03  RR-IDENTIFICATION.
  2300                05  RR-FACILITY-NUMBER PIC 9(6).
  2400            03  RR-PHYS-STATE-T  PIC 9.
  2500            03  RR-LIQUID-T      PIC 9.
  2600            03  RR-RESIDUE-T     PIC 9.
  2700            03  RR-AMOUNT-T      PIC 9(7).
  2800            03  RR-UNITS-T       PIC X.
  2900            03  RR-DISPOSAL-T    PIC 9.
  3000            03  RR-STORAGE-T     PIC 9.
  3100            03  RR-PHYS-STATE-P  PIC 9.
  3200            03  RR-LIQUID-P      PIC 9.
  3300            03  RR-RESIDUE-P     PIC 9.
  3400            03  RR-AMOUNT-P      PIC 9(7).
  3500            03  RR-UNITS-P       PIC X.
  3600            03  RR-DISPOSAL-P    PIC 9.
  3700            03  RR-STORAGE-P     PIC 9.
  3800            03  FILLER           PIC X(43).
  3900            03  RR-LINK-DATA SIZE 5 CHARACTERS.
  4000                05  RR-FACILITY-LINK PIC 9(5).
```

	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Introduction
PHASE	System Design	SECTION	TSCA Report Request Form

TSCA REPORT REQUEST FORM

The TSCA Report Request Form is completed by the user to request a report be produced. The desired sort options, selection criteria and report levels are identified and elected based on the usage of the report.

This form has been redesigned to accomodate additional items and ease in future enhancements as they occur. Refer to Exhibit A for the actual report layout.

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EXHIBIT A

G/584/19-01

TSCA REPORT REQUEST FORM

#__________

REPORT	SORT OPTIONS (5)	LEVEL
___CMR DISCHARGE (0102) ___CMR MAILING LIST (0103)	___FACILITY NUMBER ___FACILITY NAME ___FACILITY ZIP ___FACILITY DISTRIC/ ___FACILITY SIC ___FACILITY COUNTY ___FACILITY SAN. SEWER ___FACILITY RIV. BASIN ___CM NUMBER ___OUTFALL TYPE ___DESIGN USE ___RESIDUAL TYPE ___RESIDUAL STATE ___RESIDUAL CM NUMBER	___FACILITY ___CRITICAL ___OUTFALL ___RESIDUAL ___ALL
___HAZARD ASSESSMENT (08)	___CM NAME ___MATERIAL TYPE ___MATERIAL NUMBER ___ ________________	___AIR (2) ___WATER (1) ___BOTH (0)
___HAZARD PRIORITY (17)	___FACILITY NUMBER ___FACILITY NAME ___FACILITY ZIP ___FACILITY SIC ___FACILITY COUNTY ___FACILITY RIV. BASIN ___FACILITY SAN. SEWER ___USE SCORE ___TOTAL DISCHARGE SCORE ___SURFACE WATER SCORE ___GROUNDWATER SCORE ___SAN. SEWER SCORE	___FACILITY (1) ___WWTP (2) ___BOTH (3)
___CMR STATISTICS (0104)	___TSCA REQUEST FORMS (19) NUMBER TO BE PRODUCED___	

SELECTION CRITERIA/COMMENTS:

___CONFIDENTIAL-MARK ONLY IF CONFIDENTIAL DATA IS REQUIRED REQUESTER________________________DATE________

SDM/70

GENERAL DOCUMENTATION FORM

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE TSCA	**PART** Selective Reporting
PHASE Productional Design	**SECTION** Introduction

The purpose of the Selective Reporting System is to allow the user to specify exact printing and selection criteria in able to provide reports which fit its' intended use. By completing the TSCA Report Request Form the user indicated data presentation sequence and the data to be printed. Information is then extracted from the Water Surveillance Fee System files and the desired report is generated.

SDM-100

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	PART Selective Reporting
PHASE Production Design	SECTION G/584/01

G/584/01

TSCA DATA BASE RETRIEVAL AND SORT

SDM-100

THIS FORM IS AN INTEGRAL PART OF A PROPRIETARY PRODUCT FROM KATCH & ASSOCIATES AND ATLANTIC SOFTWARE, INC.
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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	PART Selective Reporting
PHASE Production Design	SECTION G/584/01

GENERAL INFORMATION:

This program creates a sequential disk file, which is derived from the facility, critical, outfall, and residual records. A workfile is created from information contained in these selected records (the selection criteria is entered via WFL). The work file is then sorted, based on the sort sequence requested via WFL, from which the sequential disk file is created.

SDM-100

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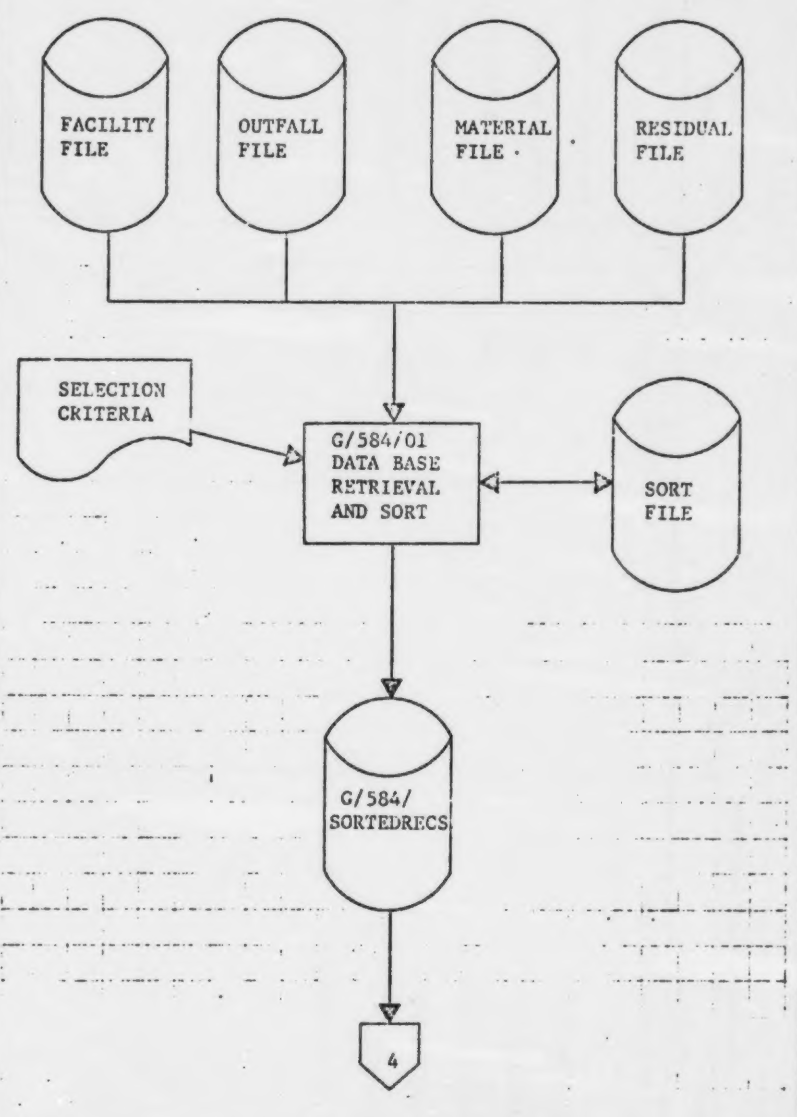
SDM/70 CHART OR TABLE FORM	PROJECT NUMBER	G584
	DATE	2/1/82

SYSTEM TITLE TSCA	PART Selective Reporting
PHASE Production Design	SECTION G/584/01

NOTES


FACILITY FILE
OUTFALL FILE
MATERIAL FILE
RESIDUAL FILE
SELECTION CRITERIA
G/584/01 DATA BASE RETRIEVAL AND SORT
SORT FILE
G/584/ SORTEDRECS
4

SDM-101

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2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

This program reads and extracts data from the facility, critical, outfall and residual files. It uses this information to create a sequential file on disk, to be used by various programs in the TSCA system. Selection and sort fields in the WFL make it necessary to recompile this program for each run.

REQUESTING DIVISION Environmental Services	SECTION TSCA	UNIT

PRODUCTION CYCLE On Request	SETUP Data Center	PAGES None	COPIES None	OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
G/602/FACILITY		6	210	C		Facilities Records	120
G/602/OUTFALL		3	120	C		Outfall Records	120
G/602/CRITICAL		3	480	C		Critical Materials Records	99
G/602/RESIDUAL		3	120	C		Residuals Records	120
SORT FILE			120	C		Program Sort File	0
G/584/SORTEDRECS		6	120	C		Selected Records	30

PROGRAM NAME TSCA Data Base Retrieval and Sort	APP.	EFFECTIVE DATE	PROGRAM NUMBER G/584/01

[illegible]

RT EMORY	SORT DISK SORT DISKPACK	SORT TAPES	COMPILER COBOL	C.P.U. TIME 12 Seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
I	DISK	G/602/FACILITY	FACILITY-FILE
I	DISK	G/602/OUTFALL	OUTFALL-FILE
I	DISK	G/602/CRITICAL	CRITICAL-FILE
I	DISK	G/602/RESIDUAL	RESIDUAL-FILE
I/O	DISK	SORT-RECORD	SORT-FILE
O	DISK	G/584/SORTEDRECS	OUT-FILE

SPECIAL INSTRUCTIONS

	SDM/70 GENERAL DOCUMENTATION FORM	**PROJECT NUMBER**	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	**PART** Selective Reporting
PHASE Productional Design	**SECTION** G/584/02

G/584/02

PRINT CMR MASTER LISTING

SDM-100

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82
SYSTEM TITLE	TSCA	PART	Selective Reporting
PHASE	Productional Design	SECTION	G/584/02

GENERAL INFORMATION:

This program reads the sequential file produced from program G/584/01 (G/584/SORTEDRECS) and produces the master listing. The information on the master listing is derived by accessing the facility, critical, outfall, and residual files by the keys in the sequential files.

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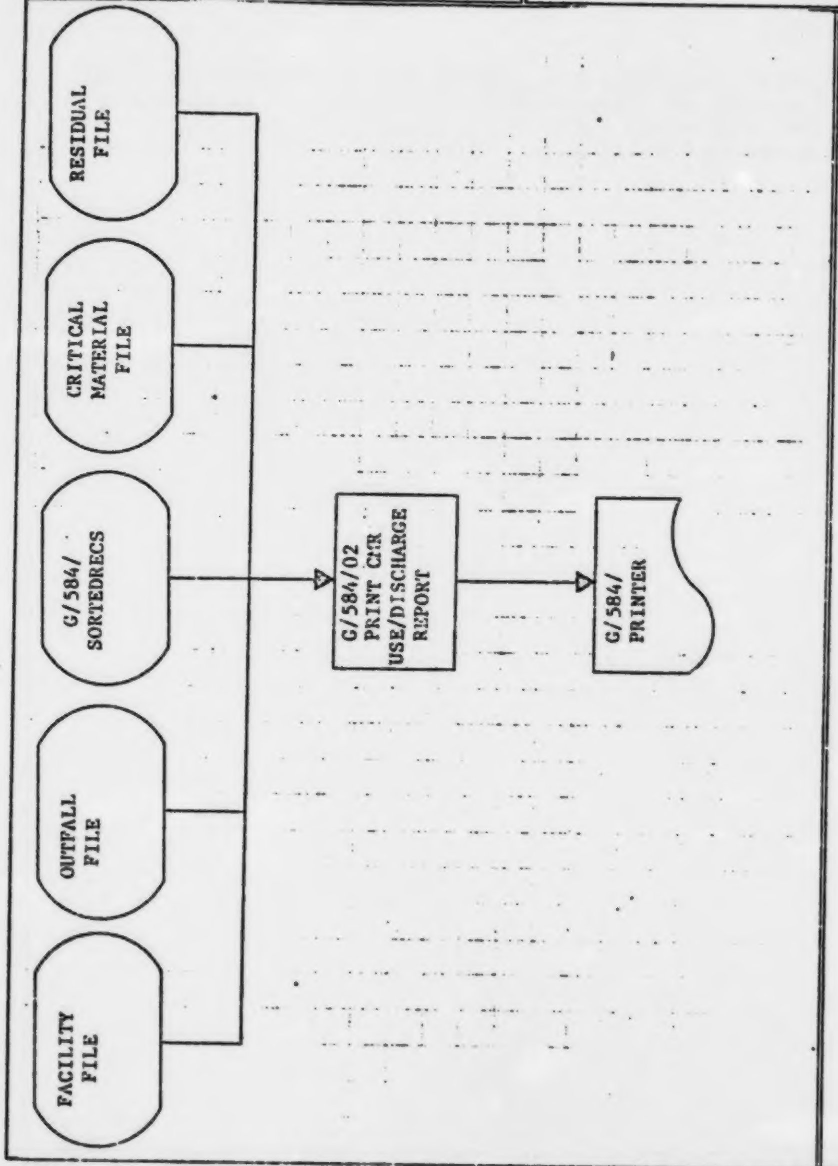
SDM/70

CHART OR TABLE FORM

PROJECT NUMBER	G584
DATE	2-1-82
PAGE	

SYSTEM TITLE	TSCA	PART	Selective Reporting
PHASE	Productional Design	SECTION	G/584/02


RESIDUAL FILE
CRITICAL MATERIAL FILE
G/584/ SORTEDRECS
OUTFALL FILE
FACILITY FILE
G/584/02 PRINT CMR USE/DISCHARGE REPORT
G/584/ PRINTER

NOTES

SDM-10¼ THIS FORM IS AN INTEGRAL PART OF A PROPRIETARY PRODUCT FROM KATCH & ASSOCIATES AND ATLANTIC SOFTWARE, INC. ITS USE AND REPRODUCTION IS PERMITTED ONLY WITHIN THE INSTALLATION LICENSED TO USE THIS PRODUCT

2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

This program reads the sequential output file created from program G/584/01, and accesses the Surveillance Fee data bases to produce the CMR Use/Discharge report.

REQUESTING DIVISION Environmental Services
SECTION TSCA
UNIT
PRODUCTION CYCLE On Request
SETUP DNR Data Center
PAGES
COPIES
OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
G/602/FACILITY	DNR	6	210	C		Facility Master File	120
G/602/OUTFALL	DNR	3	120	C		Outfall File	120
G/602/CRITICAL	DNR	3	240	C		Critical File	99
G/602/RESIDUAL	DNR	3	180	C		Residual File	120
G/584/SORTEDRECS	DNRTOXIC	6	120	C		Selected Input Records	
G/584/PRINTER	DNRTOXIC	1	132	C		Report of Selected Records	

PROGRAM NAME PRINT CMR MASTER REPORT
APP.
EFFECTIVE DATE
PROGRAM NUMBER G/584/02

[illegible]

[illegible] NA	SORT DISK NA	SORT TAPES NA	COMPILER COBOL	C.P.U. TIME 15 Seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	G/602/FACILITY	FACILITY-FILE
IN	DISK	G/602/OUTFALL	OUTFALL-FILE
IN	DISK	G/602/CRITICAL	CRITICAL-FILE
IN	DISK	G/602/RESIDUAL	RESIDUAL-FILE
IN	DISK	G/584/SORTEDRECS	SEQ-FILE
OUT	PRINTER	G/584/PRINTER	PRINT-FILE

SPECIAL INSTRUCTIONS

SDM/70 GENERAL OUTPUT DESCRIPTION		**PROJECT NUMBER**	G584
		DATE	2/1/82
SYSTEM TITLE TSCA		**PART** Selective Reporting	
PHASE Productional Design		**SECTION** G/584/02	

IDENTIFICATION	**REPORT NO.:** G/584/02 **REPORT NAME:** Critical Material Register Master Program **EXH. NO.:**
TYPE OF REPORT	☐ SUMMARY ☐ EXCEPTION ☒ DETAIL ☐ ERROR ☐ OTHER:
MEDIA OF OUTPUT	☒ PRINTED ☐ CRT ☐ CARD ☐ MICROFILM ☐ OTHER:
FREQUENCY	☐ DAILY ☐ WEEKLY ☐ MONTHLY ☒ ON DEMAND ☐ OTHER:
ACCESS SECURITY	If confidential information is requested access is limited to authorized personnel.
OUTPUT CONTENT	Contains all data as to the location, name, address and other identifying information of each selected facility. If requested critical material, outfall and residual data as reported via the wastewater booklet is present.
INTERACTION WITH DISPLAY	None
TOTALS	Total number of selected facilites printed.
APPROX. SIZE	1 page per facility (approx.)
OUTPUT USE	Monitoring guidlines for facility investigation and general information for any requesting party under the "freedom of information" Act.
OUTPUT USERS	Office of Toxic Materials Any requesting party

SDM-400

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G/584/02
RUN DATE- 01/04/82                     MICHIGAN DEPARTMENT OF NATURAL RESOURCES
                                         BUREAU OF ENVIRONMENTAL PROTECTION                              PAGE    1
                                       CRITICAL MATERIALS REGISTER MASTER PROGRAM
---------------------------------------------------------------------------------------------------------------------
FACILITY- 730201
CONTEMPRI HOMES BY ROYCROFT
---------------------------------------------------------------------------------------------------------------------
117 FIRST ST                      DISTRICT:              2    OUTFALLS:
CHESANING          MI   48616     COUNTY:               73    MAJOR DISCHARGE:              00    CRITICAL MAT:           N
                                  RIVER BASIN: 0000000        TOT. AVG. DAILY DISC:      .0000    SANITARY SEWER: 000000
---------------------------------------------------------------------------------------------------------------------
FACILITY- 730059                                                                                  SIC:                 2450
FOWLER PACKING CO
RFD 2
14371 FOWLER RD                   DISTRICT:              2    OUTFALLS:
CHESANING          MI   48616     COUNTY:               73    MAJOR DISCHARGE:              00    CRITICAL MAT:           N
                                  RIVER BASIN: 0000000        TOT. AVG. DAILY DISC:      .0000    SANITARY SEWER: 000000
---------------------------------------------------------------------------------------------------------------------
FACILITY- 730060                                                                                  SIC:                 2011
GENERAL MEATS INC
17023 S STUART RD
                                  DISTRICT:              2    OUTFALLS:
CHESANING          MI   48616     COUNTY:               73    MAJOR DISCHARGE:              01    CRITICAL MAT:           N
                                  RIVER BASIN: 0000000        TOT. AVG. DAILY DISC:      .0003    SANITARY SEWER: 000000
                                  -----------------------------------------------------------------------------------
                                  OUTFALL:     730060         % PROCESS:    80                    SIC:                 2011
                                  TYPE:             4         % COOLING:     0                    AVG. DAILY FLOW:   .0003
                                  DESIGN USE:                 % SANITARY:   20                    MAX. DAILY FLOW:   .0004
                                  GPSF:           001                                             TOT. ANN. FLOW:      0.1
---------------------------------------------------------------------------------------------------------------------
FACILITY- 730011                                                                                  DROUGHT FLOW:     999999
PEET PACKING CO
C F COLEMAN MAIN SUPERVISOR
1100 N LINE ST                    DISTRICT:              2    OUTFALLS:
CHESANING          MI   48616     COUNTY:               73    MAJOR DISCHARGE:              02    CRITICAL MAT:           Y
                                  RIVER BASIN: 2104033        TOT. AVG. DAILY DISC:     2.1240    SANITARY SEWER: 000000
                                  -----------------------------------------------------------------------------------
                                     CRITICAL MATERIAL(S)       CON.       USE.       DIS.        RES.      GPS OUTFALLS
                                  ZINC                           X                     O           4
                                  NICKEL                         X                     O           3
                                  LEAD                           X                     O           4
                                  COPPER                                    O          O           4
                                  CHROMIUM                       X                     O           4
                                  CADMIUM                        X                     O           2
                                  -----------------------------------------------------------------------------------
                                  OUTFALL:     730145         % PROCESS:     0
                                  TYPE:             1         % COOLING:   100                    AVG. DAILY FLOW:  1.8780
                                  DESIGN USE:      C2         % SANITARY:    0                    MAX. DAILY FLOW:  2.4870
                                  GPSF:           002                                             TOT. ANN. FLOW:    646.0
                                  -----------------------------------------------------------------------------------
                                  OUTFALL:     730038         % PROCESS:    90                    DROUGHT FLOW:         38
                                  TYPE:             1         % COOLING:     0                    AVG. DAILY FLOW:   .2460
                                  DESIGN USE:      C2         % SANITARY:   10                    MAX. DAILY FLOW:   .3440
                                  GPSF:           001                                             TOT. ANN. FLOW:     82.1
                                                                                                  DROUGHT FLOW:         38
```

```
G/584/02
RUN DATE- 01/04/82                MICHIGAN DEPARTMENT OF NATURAL RESOURCES
                                    BUREAU OF ENVIRONMENTAL PROTECTION                                PAGE     2
                                  CRITICAL MATERIALS REGISTER MASTER PROGRAM
                        ------------------------------------------------------------------------------------------
                        WASTEWATER RESIDUAL 730011W
                           PHYSICAL STATE: 2   SOLVENT: 1   RESIDUE: 278 AMOUNT: 0100000 G    DISPOSAL: 6    STORAGE: 34
                                                 CHROMIUM                              CADMIUM
                                                 ZINC                                  NICKEL
                                                 LEAD                                  COPPER
```

```
G/584/02
RUN DATE- 01/04/82                         MICHIGAN DEPARTMENT OF NATURAL RESOURCES
                                            BUREAU OF ENVIRONMENTAL PROTECTION                                    PAGE     2
                                          CRITICAL MATERIALS REGISTER MASTER PROGRAM
                          ----------------------------------------------------------------------------------------------------
                          WASTEWATER RESIDUAL 730011W
                             PHYSICAL STATE: 2   SOLVENT: 1   RESIDUE: 278 AMOUNT: 0100000 G    DISPOSAL: 6    STORAGE: 34
                                                   CHROMIUM                                CADMIUM
                                                   ZINC                                    NICKEL
                                                   LEAD                                    COPPER
```

SDM/70

GENERAL DOCUMENTATION FORM

PROJECT NUMBER: G584
DATE: 2/1/82

SYSTEM TITLE: TSCA
PART: Selective Reporting
PHASE: Productional Design
SECTION: G/583/04

G/584/03

PRINT CMR MAILING LIST REPORT

SDM-100

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Selective Reporting
PHASE	Productional Design	SECTION	G/584/03

GENERAL INFORMATION:

This program reads the sequential file produced by program G/584/01 (G/584/SORTEDRECS) and produces the mailing list report. The information on the mailing list is derived by accessing the facility file with the key contained in the sequential record.

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SDM/70

CHART OR TABLE FORM

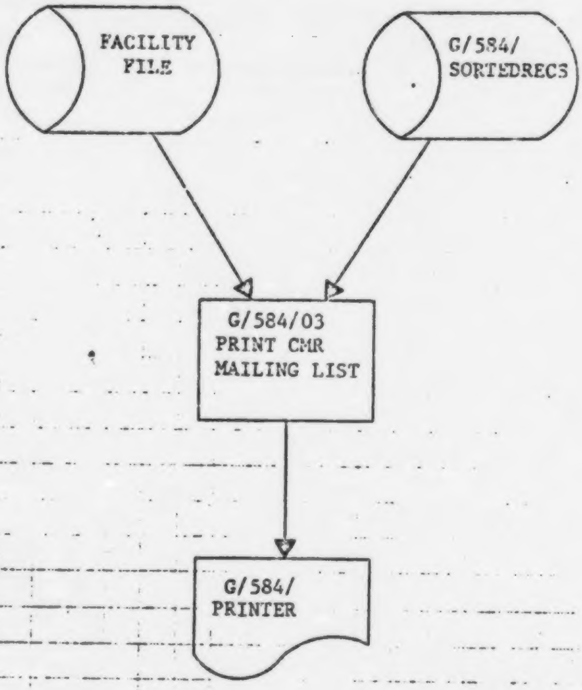
PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE TSCA

PART Selective Reporting

PHASE Productional Design

SECTION G/584/03



FACILITY FILE
G/584/ SORTEDRECS
G/584/03 PRINT CMR MAILING LIST
G/584/ PRINTER

NOTES

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2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

This program reads the sequential output file (G/584/SORTEDRECS, created by program G/584/01) and access the Surveillance Fee facility file to produce the CMR mailing list report.

REQUESTING DIVISION Environmental Services
SECTION TSCA
UNIT
PRODUCTION CYCLE On Request
SETUP DNR Data Center
PAGES
COPIES
OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
G/602/FACILITY	DNR	6	210	C		Facility Master File	120
G/584/SORTEDRECS	DNRTOXIC	6	120	C		Selected Input Records	
G/584/PRINTER	DNRTOXIC	1	132	C		Mailing List	

PROGRAM NAME Print CMR Mailing List
APP.
EFFECTIVE DATE
PROGRAM NUMBER G/584/03

[illegible]

[illegible] MEMORY NA	SORT DISK NA	SORT TAPES NA	COMPILER COBOL	C.P.U. TIME 10 Seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	G/602/FACILITY	FACILITY-FILE
IN	DISK	G/584/SORTEDRECS	SEQ-FILE
OUT	PRINTER	G/584/PRINTER	PRINT-FILE

SPECIAL INSTRUCTIONS

	SDM/70 GENERAL OUTPUT DESCRIPTION	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	PART Selective Reporting
PHASE Productional Design	SECTION G/584/03

IDENTIFICATION	REPORT NO.: G/584/03	REPORT NAME: Critical Materials Register Mailing List			EXH. NO.:	
	TYPE OF REPORT	☐ SUMMARY	☐ EXCEPTION	☒ DETAIL	☐ ERROR	☐ OTHER:
	MEDIA OF OUTPUT	☒ PRINTED	☐ CRT	☐ CARD	☐ MICROFILM	☐ OTHER:
	FREQUENCY	☐ DAILY	☐ WEEKLY	☐ MONTHLY	☒ ON DEMAND	☐ OTHER:

ACCESS SECURITY	None
OUTPUT CONTENT	Contains mailing address and skeleton identification information for selected facilities.
INTERACTION WITH DISPLAY	None
TOTALS	None
APPROX. SIZE	1 line per facility
OUTPUT USE	Identify facilities within a selection criteria without obtaining a large amount of non-required information
OUTPUT USERS	Office of Toxic Materials Any requesting party

SDM-400

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G/584/03
RUN DATE- 01/04/82

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
BUREAU OF ENVIRONMENTAL PROTECTION
CRITICAL MATERIALS REGISTER MAILING LIST

FACILITY	NAME	ATTEN	STREET	CITY	ZIP	CO	RIV.BAS.	SEWER	SIC
935305	ALTAIR TOOL & ENG CO		PLANT RD	BOYNE CITY	49712	15	0000000	000000	3540
935495	BIT OF FINLAND		109 BRIDGE	CHARLEVOIX	49720	15	0000000	000000	3990
935309	BOYNE FALLS LOG HOMES		2030 US 131	BOYNE FALLS	49713	15	0000000	000000	2450
931914	BOYNE LAUNDRY AND DRY CL	JEFFERY F BRADFORD	501 S LAKE ST	BOYNE CITY	49712	15	0000000	150020	7215
935496	BOYNE MACHINE CO		BOYNE CITY RD	CHARLEVOIX	49720	15	0000000	000000	3540
935310	BOYNE VALLEY ENGRAVING		LAKE LOUISE RJ	BOYNE FALLS	49713	15	0000000	000000	3540
150037	CAL COBLENTZ CUSTOM BUTC		R2 BOX 183 ADVANCE ROAD	EAST JORDAN	49727	15	0000000	000000	2011
920614	CHARLEVOIX COURIER CORP		405 BRIDGE ST PO BOX 117	CHARLEVOIX	49720	15	0000000	000000	2710
920339	CHARLEVOIX MACHINE PRODU	JAMES BEARSS	RTE 1	CHARLEVOIX	49720	15	0000000	000000	3540
931263	CHARLEVOIX PRODUCTS INC	GORDON L HIMEBAUCH	PO BOX 114	CHARLEVOIX	49720	15	0000000	000000	3540
920615	CHARLEVOIX REDI MIX INC		RTE 3	CHARLEVOIX	49720	15	0000000	000000	3273
150013	CONSUMERS POWER CO	BIG ROCK PLT, ATTN: R L	1945 W PARNALL ROAD	CHARLEVOIX.	49720	15	0814010	000000	4911
924867	CONTROL ENG CO BOYNE CIT	CHARLES E BARTLETT	1054 E DIVISION PO BOX 1	BOYNE CITY	49712	15	0000000	000000	3444
150067	COURTER INC	SUB OF MITRE INDUSTRIES	375 N LAKE ST	BOYNE CITY	49712	15	0814040	000000	3811
923337	D L SMITH SAND & GRAVEL	DAVID L SMITH	ROUTE 3 BAILEY ROAD	EAST JORDAN	49727	15	0000000	000000	1440
150057	D M E CO DIV OF VSI CORP	AME PLANT CHARLEVOIX	29111 STEPHENSON HWY	MADISON HTS	48071	15	0000000	000000	3540
935311	DUNHAM LELAND		OLD MACKINAW TR	BOYNE FALLS	49713	15	0000000	000000	2499
950153	EAST JORDAN COOP	GENERAL MANAGER	102 STATE STREET PO BOX	EAST JORDAN	49727	15	0000000	000000	0700
900417	EAST JORDAN COUNTRY HOUS	BOYNE CITY RD	RT #2 BOX 29	EAST JORDAN	49727	15	0000000	000000	5810
150015	EAST JORDAN IRON WKS INC	W J HAUCK	301 SPRING ST.	EAST JORDAN	49727	15	0814010	000000	3321
150049	EAST JORDAN IRON WORKS	ATT R W CARPENTER	PO BOX 439	EAST JORDAN	49727	15	0814040	000000	3714
938407	EAST JORDAN IRON WORKS I		2345 CHICAGO DR S W	GRAND RAPIDS	49509	15	0000000	000000	3321
937650	EAST JORDAN PLASTICS INC		LA CROIX RD	EAST JORDAN	49727	15	0814041	000000	2820
924864	ESSEX GROUP INC	BOYNE CITY PLANT 082	475 N LAKE STREET	BOYNE CITY	49712	15	0000000	000000	3714
150066	FREEDMAN ARTCRAFT ENG CO		BOX 228 US 131 S	CHARLEVOIX	49720	15	0000000	150021	2500
935498	GREAT LAKES SHIPWRECK CO		R #1 BOX 45	CHARLEVOIX	49720	15	0000000	000000	2500
935306	GREGG PUBLICATIONS		110 S LAKE ST	BOYNE CITY	49712	15	0000000	000000	2711
150050	GULF & WSTRN METALS PLT		117 S. LAKE ST.	EAST JORDAN	49727	15	0814040	150021	3465
150085	HODGKISS & DOUMA INC	PO BOX 311		PETOSKEY	49770	15	0000000	000000	1440
933363	HOOKERS CLEANERS OF CHAR	WILLIS L PETERS	701 1/2 BRIDGE	CHARLEVOIX	49720	15	0814040	150021	7210
150053	HOSKINS MFG CO	BARBARA M SKEEL PLANT MG	PO BOX 38 M 66 HWY	CHARLEVOIX	49720	15	0814996	150021	3340
925190	HUFFORD INDUSTRIES INC		N PETOSKEY RD	CHARLEVOIX	49720	15	0000000	000000	3550
935312	HUNT WILLIAM & SON INC		US 131 R 1	BOYNE FALLS	49713	15	0000000	000000	2490
935499	IMPAC TOOL CO		401 W CARPENTER	CHARLEVOIX	49720	15	0000000	000000	3540
150017	LEXALITE CORP	US 31 NORTH		CHARLEVOIX.	49720	15	0814010	000000	3079
935500	LIETZ INDUSTRIES		N US 31 HWY	CHARLEVOIX	49720	15	0000000	000000	3540
924869	MATELSKI MILLING			BOYNE FALLS	49713	15	0000000	000000	2421
935501	MAXBAUERS DAIRY		206 W LINCOLN	CHARLEVOIX	49720	15	0000000	000000	2020
935502	MC CUTHEN BOAT WORKS		EATON AVE	CHARLEVOIX	49720	15	0000000	000000	3732
933365	MCCLELLAND CLEANERS	M D IRISH	106 ANTRIM	CHARLEVOIX	49720	15	0000000	000000	7210
150018	MEDUSA CEMENT COMPANY		BELLS BAY RD., PO BOX 36	CHARLEVOIX	49720	15	0814010	000000	3241
952358	MICHIGAN SCIENTIFIC CORP		730 BELLEVUE	MILFORD	48042	15	0000000	000000	3810
935503	MIDWEST INTERNATIONAL	DIV RON PAIR ENTERPRISES	105 STOVER RD	CHARLEVOIX	49720	15	0000000	000000	3560
150019	NORTHERN MICH ELE COOP	ADVANCE STEAM PLANT	PO BOX 138	BOYNE CITY	49712	15	0814040	000000	4911
935308	NORTHLAND SEPTIC TANK SE		ADVANCE	BOYNE CITY	49712	15	0000000	000000	3271
935504	SEELEYS PRINTING SERVICE		VAN PELT PL	CHARLEVOIX	49720	15	0000000	000000	2750
150014	SHERMAN CANNING CO., INC		4TH (STATE STS.	EAST JORDAN	49727	15	0814041	000000	2033
921442	SITE PLANNING DEVELOPMEN	JOHN W CAMPBELL	PO BOX 465 1008 TAYLOR R	CHARLEVOIX	49720	15	0000000	000000	1440
935505	VILLAGE GRAPHICS INC		111 ANTRIM	CHARLEVOIX	49720	15	0000000	000000	2750
935506	WEATHER SHIELD SPORTS EQ		PETOSKY RD PO BOX 227	CHARLEVOIX	49720	15	0000000	000000	2300
932878	WHEELCO INC	GEORGE R WHEELER	6156 ROGERS BRIDGE RD	EAST JORDAN	49727	15	0000000	000000	3465
923706	WILDWOOD ASSC	J R SMITH	2775 WILDWOOD HARBOR RD	BOYNE CITY	49712	15	0000000	000000	7032

	SDM/70 GENERAL DOCUMENTATION FORM	**PROJECT NUMBER**	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	**PART** Selective Reporting
PHASE Productional Design	**SECTION** G/584/04

G/584/04

C.M.R. STATISTICAL REPORT

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	PART Selective Reporting
PHASE Productional Design	SECTION G/584/04

GENERAL INFORMATION:

This program calculates estimated maximum and minimum values for usage, discharge, and residuals of critical materials as reported to the state by TSCA Facilities.

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SDM/70
CHART OR TABLE FORM

PROJECT NUMBER	G584
DATE	2/1/82

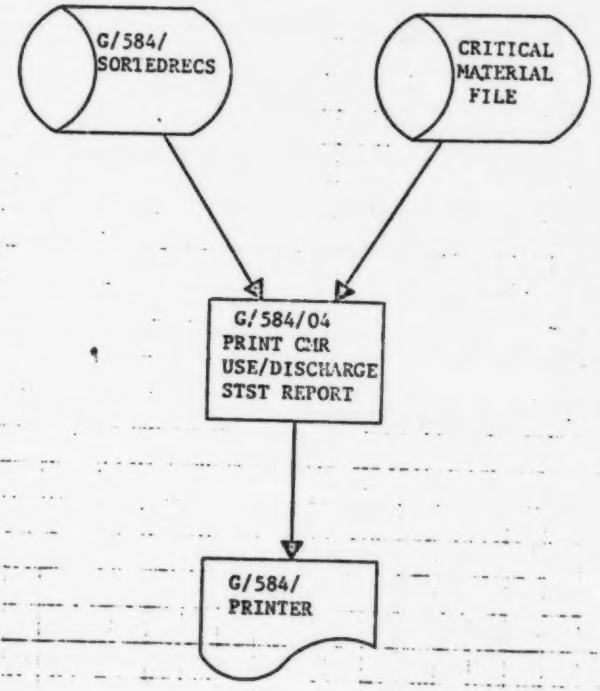
SYSTEM TITLE TSCA

PHASE Productional Design

PART Selective Reporting

SECTION G/584/04

NOTES


G/584/
SORTEDRECS
CRITICAL
MATERIAL
FILE
G/584/04
PRINT CMR
USE/DISCHARGE
STST REPORT
G/584/
PRINTER

SDM-101

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2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

This program reports minimum and maximum estimated values of all critical materials used, discharged or contained in residuals as reported by those facilities required by law in the State of Michigan.

REQUESTING DIVISION Environmental Services

SECTION TSCA

UNIT

PRODUCTION CYCLE On Request

SETUP DNR Data Center

PAGES 1-10

COPIES

OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
G/602/CRITICAL	DNR	3	480	C		Critical Materials File	99
G/584/SORTEDRECS	DNRTOXIC	6	120	C		Selected Input Records	
G/584/PRINTER	DNRTOXIC	1	132	C		C.M.R. Statistical Report	

PROGRAM NAME C.M.R. Statistical Report

APP.

EFFECTIVE DATE

PROGRAM NUMBER G/584/04

[illegible]

SORT MEMORY NA	SORT DISK NA	SORT TAPES NA	COMPILER COBOL	C.P.U. TIME 13 seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	G/602/CRITICAL	CRITICAL-FILE
IN	DISK	G/584/SORTEDRECS	SEQ-FILE
OUT	PRINTER	G/584/PRINTER	PRINT-FILE

SPECIAL INSTRUCTIONS

	SDM/70 GENERAL OUTPUT DESCRIPTION	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	PART Selective Reporting
PHASE Productional Design	SECTION G/584/04

IDENTIFICATION	REPORT NO. G/584/04	REPORT NAME: CMR Statistical Report			EXH. NO.:	
	TYPE OF REPORT	☒ SUMMARY	☐ EXCEPTION	☐ DETAIL	☐ ERROR	☐ OTHER
	MEDIA OF OUTPUT	☒ PRINTED	☐ CRT	☐ CARD	☐ MICROFILM	☐ OTHER
	FREQUENCY	☐ DAILY	☐ WEEKLY	☐ MONTHLY	☒ ON DEMAND	☐ OTHER

ACCESS SECURITY	None
OUTPUT CONTENT	Provides minimum and maximum poundage of each critical material being used, discharged or kept as a residual by all facilities selected. Due to the nature of reporting by the facilities, only a range of poundage can be determined.
INTERACTION WITH DISPLAY	None
TOTALS	Numbers of facilities examined, total minimum and maximum poundage of critical materials used, discharged and held has residuals
APPROX. SIZE	1 line per critical material
OUTPUT USE	Provides an approximation of materials and volumes that should exist in a given area.
OUTPUT USERS	Office of Toxic Materials Any requesting party

SDM-400

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G/584/04
RUN DATE- 01/04/82

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
BUREAU OF ENVIRONMENTAL PROTECTION
C.M.R. STATISTICAL REPORT

CRITICAL MATERIAL	C.A.S. #	USAGE/LBS			DISCHARGE/LBS			RESIDUAL/LBS		
		#/FAC	MINIMUM	MAXIMUM	#/FAC	MINIMUM	MAXIMUM	#/FAC	MINIMUM	MAXIMUM
ANILINE	00062533	1		1						
ANTIMONY	CLASS010	1	1	10	1		1			
BENZENE	00071432	1		1						
BERYLLIUM	CLASS012	1	11	100						
CADMIUM	CLASS013	3	1012	10101	2	502	1010	3	102	511
CARBON TETRACHLORIDE	00056235	1	1	10	1		1			
CHLORINE	07782505	1	78000	78000	1	1001	10000			
CHROMIUM	CLASS015	11	68638	87810	9	2217	13112	6	225	1211
COBALT	CLASS016	2	1001	10001				1		1
COPPER	CLASS017	8	2216	21111	5	13	122	4	502	1012
CYANIDES	CLASS018	6	17005	53010	6	135	811	3	2	21
DI-N-BUTYL PHTHALATE	00084742	1	1	10						
DI-N-OCTYL PHTHALATE	00117840	1	1	10						
1,4-DIOXANE	00123911	1	11	100						
ETHYLENE THIOUREA	00096457	1		1						
HYDRAZINE	00302012	2	1002	10010	1	1	10			
HYPOCHLORITE	CLASS014	2	1012	10100	1	11	100			
LEAD	CLASS019	4	2014	20110	1	1	10	4	1013	10111
MERCURY	CLASS021	1	1	10				1	1	10
NICKEL	CLASS022	8	338124	347701	6	1015	10131	3	102	511
POLYCHLORINATED BIPHENYLS(PCB)	CLASS079	1	101	500						
SILVER	CLASS024	3	103	520	1	1	10	2	2	20
TETRACHLOROETHYLENE	00127184	9	7008	62001				7	815	2602
THIOUREA	00062566	1	1001	10000	1	501	1000	1	101	500
TRIARYL PHOSPHATE ESTERS	CLASS084	1	30000	30000						
TRICHLOROETHYLENE	00079016	3	71012	80100	1		1	2	16891	25890
XYLENE	01330207	1	101	500				1	11	100
ZINC	CLASS027	12	2365626	2375710	9	1226	11213	5	1104	10521

```
                                        FACILITIES       MINIMUM           MAXIMUM
TOTAL CRITICAL MATERIAL USAGE                   88       2985003           3207538
TOTAL CRITICAL MATERIAL DISCHARGE               46          6624             47532
TOTAL CRITICAL MATERIAL RESIDUAL                43         20871             53021
```

SDM/70

GENERAL
DOCUMENTATION FORM

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE TSCA	PART Hazard Assessment
PHASE Productional Design	SECTION Introduction

The Hazard Assessment process is a priority ranking-point assignment system used to evaluate chemicals for possible inclusion on the Critical Material Register. Factors of environmental concern for potentially deleterious substances are separated into seven specific areas: 1) acutoxicity; 2) carcinogenicity; 3) hereditary mutagenicity; 4) teratogenicity; 5) persistence; 6) bioaccumulation; 7) other adverse effects (including subacute and chronic effects to terrestrial and aquatic life,phytotoxicity and aesthetics). The hazard assessment process is based on extensive review of the scientific literature on physical, chemical, and toxicological properties of industrial and agricultural chemicals. Chemicals are numerically scored as to their hazard and those which pose a high environmental concern are included in the Critical Material Register.

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SDM-100

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G/584
		DATE	02/01/82

SYSTEM TITLE	TSCA	**PART**	Hazardous Assessment
PHASE	Productional Design	**SECTION**	G/584/07

G/584/07

BUILD HAZARD ASSESSMENT FILE

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G/584
		DATE	02/01/82

SYSTEM TITLE TSCA	PART Hazardous Assessment
PHASE Productional Design	SECTION G/584/07

GENERAL INFORMATION:

This program uses the forms software capabilities to create, add records, change records and delete records to the Hazardous Assessment File. The program also prints a listing of all tranactions done during the execution of this program.

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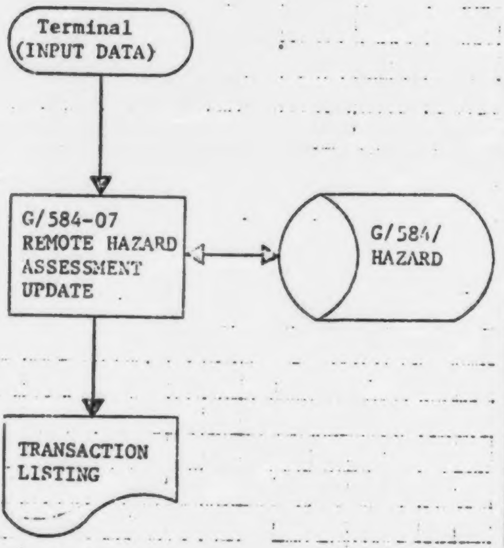
SDM/70

CHART OR TABLE FORM

PROJECT NUMBER	G/584
DATE	02/01/82

SYSTEM TITLE	TSCA	PART	Hazardous Assessment
PHASE	Productional Design	SECTION	G/584/07


Terminal
(INPUT DATA)
G/584-07
REMOTE HAZARD
ASSESSMENT
UPDATE
G/584/
HAZARD
TRANSACTION
LISTING

NOTES

SDM-101

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2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

This program builds and updates the Hazard Assessment File (G/584/Hazard) via a remote terminal using the forms capabilities.

REQUESTING DIVISION

SECTION

UNIT

PRODUCTION CYCLE

SETUP

PAGES

COPIES

OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
G/584/Hazard		6	120	C		Hazard Assessment File	999
Input-Record		1	1920	C		Remote Input	
Screen-Display		1	1920	C		Remote Screen Display	
G/584/07/Forms		1	2700	C		Forms File	
G/584/Printer		1	132			Transaction Report	

PROGRAM NAME Remote Hazard Assessment Update

APP.

EFFECTIVE DATE

PROGRAM NUMBER G/584/07

[illegible]

RT EMORY	SORT DISK	SORT TAPES-	COMPILER	C.P.U. TIME
			- -	

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	G/584/HAZARD	HAZARD-FILE
IN	DISK	G/584/07/FORMS	FILE31
IN	REMOTE	INPUT-RECORD	FILE60
OUT	REMOTE	SCREEN-DISPLAY	FILE61
OUT	PRINTER	G/584/PRINTER	PRINT-FILE

SPECIAL INSTRUCTIONS

SDM/70

GENERAL OUTPUT DESCRIPTION

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE	TSCA
PHASE	Productional Design
PART	Hazard Assessment
SECTION	G/584/07

IDENTIFICATION

REPORT NO.: G/584/07 REPORT NAME: Hazard Transaction Report EXH. NO.:

TYPE OF REPORT	☐ SUMMARY	☐ EXCEPTION	☒ DETAIL	☐ ERROR	☐ OTHER:
MEDIA OF OUTPUT	☒ PRINTED	☐ CRT	☐ CARD	☐ MICROFILM	☐ OTHER:
FREQUENCY	☐ DAILY	☐ WEEKLY	☐ MONTHLY	☒ ON DEMAND	☐ OTHER:

ACCESS SECURITY	None
OUTPUT CONTENT	Report contains a history of all successfully enterred maintenance. The 'before' image is printed for all changes and deletes, while the 'after' image is printed for adds and changes.
INTERACTION WITH DISPLAY	Echos the terminal entry process for traceback.
TOTALS	None
APPROX. SIZE	11" x 8½", number of pages variable
OUTPUT USE	Serves as an audit trail for past maintenance to the Hazard Assessment File.
OUTPUT USERS	Office of Toxic Materials, 1 copy

SDM-400

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```
CHANGE OLD 000139946NITHIAZIDE                                   087087111***7 AP7 AP** * ***-NS3NS3* * ***RNIT250000680
       NEW 000139946NITHIAZIDE                                   087087111***7 AP7 AP** * ***-NS3NS3* * ***RNIT100000680
CHANGE OLD 000139139NITRILOTRIACETIC ACID                        056056221*2** --* ---** * 0T*-0320323 3 ***ONIT400000680
       NEW 000139139NITRILOTRIACETIC ACID                        056056221*2** --* ---** * 0T*-0320323 3 ***ONIT102000680
CHANGE OLD 0006028795-NITROACENAPHTHYLENE                        078078*******7 AP7 AP** * ***-NS3NS3* * ***ONIT450000680
       NEW 0006028795-NITROACENAPHTHYLENE                        078078*******7 AP7 AP** * ***-NS3NS3* * ***ONIT104000680
CHANGE OLD 0001193462-NITRO-4-AMINOPHENOL                        066066111***3 PA3 PA** * ***-0220222 2 ***ONIT486000680
       NEW 0001193462-NITRO-4-AMINOPHENOL                        066066111***3 PA3 PA** * ***-0220222 2 ***ONIT196000680
CHANGE OLD 000100016P-NITROANILINE                               047047222**** --* ---** * ***-0220222 2 ***ONIT560001079
       NEW 000100016P-NITROANILINE                               047047222**** --* ---** * ***-0220222 2 ***ONIT180001079
CHANGE OLD 0000995925-NITRO-O-ANISIDINE                          087087111***7 AP7 AP** * ***-NS3NS3* * ***ONIT590000680
       NEW 0000995925-NITRO-O-ANISIDINE                          087087111***7 AP7 AP** * ***-NS3NS3* * ***ONIT200000680
CHANGE OLD 000091236O-NITROANISOLE                               NS9NS9******* --* ---** * ***-NS3NS3* * ***ONIT590000680
       NEW 000091236O-NITROANISOLE                               NS9NS9******* --* ---** * ***-NS3NS3* * ***ONIT202000680
CHANGE OLD 000098953NITROBENZENE                                 04504522112** --* ---** * *-0P0210212 2 1*0PNIT580000680
       NEW 000098953NITROBENZENE                                 04504522112** --* ---** * *-0P0210212 2 1*0PNIT204000680
CHANGE OLD 0000929334-NITROBIPHENYL                              087087111***7 PH7 PH** * ***-NS3NS3* * ***ONIT600000579
       NEW 0000929334-NITROBIPHENYL                              087087111***7 PH7 PH** * ***-NS3NS3* * ***ONIT200000579
CHANGE OLD 001836755NITROFEN                                     1151152221**3 PA3 PA** * *-3B0320323 3 ***PNIT610000680
       NEW 001836755NITROFEN                                     1151152221**3 PA3 PA** * *-3B0320323 3 ***PNIT208000680
CHANGE OLD 0005558401-((5-NITROFURFURYLIDENE)AMINO)-2-IMIDAZ066066111***3 PA3 PA** * ***-0220222 2 ***RNIT620000680
       NEW 0005558401-((5-NITROFURFURYLIDENE)AMINO)-2-IMIDAZ066066111***3 PA3 PA** * ***-0220222 2 ***RNIT300000680
CHANGE OLD 000531828N-((4,5-NITRO-2-FURANYL)-2-THIAZOLYL)ACE107107*******7 AP7 AP** * ***-0320323 3 ***RNIT631000680
       NEW 000531828N-((4,5-NITRO-2-FURANYL)-2-THIAZOLYL)ACE107107*******7 AP7 AP** * ***-0320323 3 ***RNIT302000680
CHANGE OLD 000051752NITROGEN MUSTARD                             0760763333**2 SS2 SS** * ***-0220222 2 ***ONIT640000680
       NEW 000051752NITROGEN MUSTARD                             0760763333**2 SS2 SS** * ***-0220222 2 ***ONIT304000680
CHANGE OLD 000055867NITROGEN MUSTARD HYDROCHLORIDE               066066333***2 SS2 SS** * ***-0120121 1 ***RNIT650000680
       NEW 000055867NITROGEN MUSTARD HYDROCHLORIDE               066066333***2 SS2 SS** * ***-0120121 1 ***RNIT306000680
CHANGE OLD 000126852NITROGEN MUSTARD, N-OXIDE                    037037222**** --* ---** * ***-0120121 1 ***RNIT650000680
       NEW 000126852NITROGEN MUSTARD, N-OXIDE                    037037222**** --* ---** * ***-0120121 1 ***RNIT306000680
CHANGE OLD 000302705NITROGEN MUSTARD N-OXIDE HYDROCHLORIDE      037037******2 SS2 SS** * ***-0120121 1 ***RNIT670000680
       NEW 000302705NITROGEN MUSTARD N-OXIDE HYDROCHLORIDE      037037******2 SS2 SS** * ***-0120121 1 ***RNIT400000680
CHANGE OLD 000055630NITROGLYCERINE                               028028******* --* ---** * ***-0220222 2 ***ONIT680000879
       NEW 000055630NITROGLYCERINE                               026026******* --* ---** * ***-0220222 2 ***ONIT402000879
CHANGE OLD CLASS074NITROPHENOLS                                  027027222*2** --* ---** * ***-0020002* * ***ONIT740000579
       NEW CLASS074NITROPHENOLS                                  027027222*2** --* ---** * ***-0020002* * **0ONIT404000579
CHANGE OLD 0053071422-NITRO-P-PHENYLENEDIAMINE                   056056111***3 PA3 PA** * ***-0120121 1 ***ONIT750000680
       NEW 0053071422-NITRO-P-PHENYLENEDIAMINE                   056056111***3 PA3 PA** * ***-0120121 1 ***ONIT406000680
CHANGE OLD 0000794692-NITROPROPANE                               075055222*2*3 PA2 SS** * ***-0210112 1 ***RNIT760000680
       NEW 0000794692-NITROPROPANE                               075055222*2*3 PA2 SS** * ***-0210112 1 **0ONIT408000680
CHANGE OLD 000108032NITROPROPANE                                 027027222**** --* ---** * ***-0020002* * **0ONIT770001079
       NEW 000108032NITROPROPANE                                 027027222**** --* ---** * ***-0020002* * **0ONIT500001079
CHANGE OLD 003817116N NITROSO-N-BUTYL-N-(4-HYDROXYBUTYL)AMIN116116111***7 HP7 HP** * ***-0320323 3 ***ONIT820000680
       NEW 003817116N NITROSO-N-BUTYL-N-(4-HYDROXYBUTYL)AMIN116116111***7 HP7 HP** * ***-0320323 3 ***ONIT502000680
CHANGE OLD 000924163N-NITROSO-DI-N-BUTYLAMINE                    116116111***7 AP7 AP** * ***-0320323 3 ***ONIT781000780
       NEW 000924163N-NITROSO-DI-N-BUTYLAMINE                    116116111***7 AP7 AP** * ***-0320323 3 ***ONIT504000780
CHANGE OLD 000055185N-NITROSO-DIETHYLAMINE                       126126222***7 AP7 AP** * ***-0320323 3 ***ONIT800000579
       NEW 000055185N-NITROSO-DIETHYLAMINE                       126126222***7 AP7 AP** * ***-0320323 3 ***ONIT506000579
CHANGE OLD 000062759N-NITROSO-DIMETHYLAMINE                      170136733**77 PH7 PH** * ***-0320323 3 ***ONIT850000780
       NEW 000062759N-NITROSO-DIMETHYLAMINE                      170136733**77 PH7 PH** * ***-0320323 3 ***ONIT508000780
CHANGE OLD 000138896N-NITROSO-DIMETHYL ANILINE                   057057222***3 PA3 PA** * ***-NS3NS3* * ***ONIT840000579
       NEW 000138896N-NITROSO-DIMETHYL ANILINE                   057057222***3 PA3 PA** * ***-NS3NS3* * ***ONIT600000579
CHANGE OLD 001116547N-NITROSODIETHANOLAMINE                      037037000***3 PA3 PA** * ***-NS3NS3* * ***ONIT865000680
       NEW 001116547N-NITROSODIETHANOLAMINE                      037037000***3 PA3 PA** * ***-NS3NS3* * ***ONIT602000680
CHANGE OLD 000086306N-NITROSODIPHENYLAMINE                       066066111***3 PA3 PA** * ***-0220222 2 ***ONIT870000780
       NEW 000086306N-NITROSODIPHENYLAMINE                       066066111***3 PA3 PA** * ***-0220222 2 ***ONIT604000780
CHANGE OLD 000156105P-NITROSODIPHENYLAMINE                       106105331*3*7 AP7 AP** * *-0BNS3NS3* * ***ONIT875000680
       NEW 000156105P-NITROSODIPHENYLAMINE                       106105331*3*7 AP7 AP** * *-0BNS3NS3* * ***ONIT606000680
CHANGE OLD 000759739N-NITROSO-N-ETHYLUREA                        154154222***7 PH7 PH4* * 0**-0220222 2 ***ONIT855000680
       NEW 000759739N-NITROSO-N-ETHYLUREA                        154154222***7 PH7 PH4* * 0**-0220222 2 ***ONIT608000680
CHANGE OLD 010595956N-NITROSOMETHYLETHYLAMINE                    057057222***3 PA3 PA** * ***-NS3NS3* * ***ONIT890000680
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  90    ******************************************
  91    *4/8/81  VERSION 2 CLC                   *
  92    *       CHANGE HRD-MTG-SCORE, PRSIST-SCR *
  93    *              PLANT-SCR    , ASTH-SCR   *
  94    *             TO INCLUDE WATER SCORES    *
  99    ******************************************
 100
 200     FD  HAZARD-FILE
 300         BLOCK CONTAINS 6 RECORDS
 400         RECORD CONTAINS 120 CHARACTERS
 500         VALUE OF ID IS "G"/"584"/"HAZARD"
 600         SAVE-FACTOR IS 999
 700         DATA RECORD IS HAZARD-RECORD.
 800
 900
1000     01  HAZARD-RECORD.
1100         03  HAZ-KEY                           PIC X(8).
1200         03  HAZ-DATA.
1300             05  HAZ-NAME                      PIC X(40).
1400             05  HAZ-AIRTOT-SCR.
1500                 07  HAZ-AIR-TOTSCR1           PIC XX.
1600                 07  HAZ-AIR-TOTSCR2           PIC X.
1700             05  HAZ-WATTOT-SCR.
1800                 07  HAZ-WAT-TOTSCR1           PIC XX.
1900                 07  HAZ-WAT-TOTSCR2           PIC X.
2000             05  HAZ-AIR-ACT-TOX-SCR           PIC X.
2100             05  HAZ-WAT-ACT-TOX-SCR           PIC X.
2200             05  HAZ-ORAL-TOX-SCR              PIC X.
2300             05  HAZ-DRM-TOX-SCR               PIC X.
2400             05  HAZ-AQT-TOX-SCR               PIC X.
2500             05  HAZ-AIR-INHAL-TOX-SCR         PIC X.
2600             05  HAZ-AIR-CARC-SCR.
2700                 07  HAZ-AIR-CARC1             PIC X.
2800                 07  HAZ-AIR-CARC2             PIC X.
2900                 07  HAZ-AIR-CARC3             PIC XX.
3000             05  HAZ-WAT-CARC-SCR.
3100                 07  HAZ-WAT-CARC1             PIC X.
3200                 07  HAZ-WAT-CARC2             PIC X.
3300                 07  HAZ-WAT-CARC3             PIC XX.
3400             05  HAZ-AIR-HRD-MTG-SCR           PIC X.
3401             05  HAZ-WAT-HRD-MTG-SCR           PIC X.
3500             05  HAZ-AIR-TRG-SCR1              PIC X.
3600             05  HAZ-AIR-TRG-SCR2              PIC X.
3700             05  HAZ-WAT-TRG-SCR1              PIC X.
3800             05  HAZ-WAT-TRG-SCR2              PIC X.
3900             05  HAZ-AIR-PRSIST-SCR.
4000                 07  HAZ-AIR-PERS1             PIC X.
4100                 07  HAZ-AIR-PERS2             PIC X.
4101             05  HAZ-WAT-PRSIST-SCR.
4102                 07  HAZ-WAT-PERS1             PIC X.
4103                 07  HAZ-WAT-PERS2             PIC X.
4200             05  HAZ-BIOA-SCR.
4300                 07  HAZ-BIO1                  PIC X.
4400                 07  HAZ-BIO2                  PIC X.
4500             05  HAZ-AIR-OTH-AD-SCR.
4600                 07  HAZ-AIR-OTH1              PIC XX.
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4700              07  HAZ-AIR-OTH2         PIC X.
4800          05  HAZ-WAT-OTH-AD-SCR.
4900              07  HAZ-WAT-OTH1         PIC XX.
5000              07  HAZ-WAT-OTH2         PIC X.
5100          05  HAZ-AIR-TRR-SCR.
5200              07  HAZ-AIR-TRR-SCR1     PIC X.
5300              07  HAZ-AIR-TRR-SCR2     PIC X.
5400          05  HAZ-WAT-TRR-SCR.
5500              07  HAZ-WAT-TRR-SCR1     PIC X.
5600              07  HAZ-WAT-TRR-SCR2     PIC X.
5700          05  HAZ-AQT-SCR              PIC X.
5800          05  HAZ-AIR-PLANT-SCR        PIC X.
5801          05  HAZ-WAT-PLANT-SCR        PIC X.
5900          05  HAZ-AIR-ASTH-SCR         PIC X.
5901          05  HAZ-WAT-ASTH-SCR         PIC X.
6000          05  HAZ-MAT-TYPE             PIC X.
6100          05  HAZ-ALPHA-NAME.
6200              07  HAZ-MAT-NAME         PIC XXX.
6300              07  HAZ-MAT-NUMB1        PIC XX.
6400              07  HAZ-MAT-NUMB2        PIC XXX.
6500          05  HAZ-ENTER-DATE           PIC XXXX.
6600      03  FILLER               PIC X(12).
```

SDM/70
GENERAL
DOCUMENTATION FORM

PROJECT NUMBER G584
DATE 2/2/82

SYSTEM TITLE TSCA
PART Hazardous Assessment
PHASE Productional Design
SECTION G/534/08

G/584/08

PRINT HAZARD ASSESSMENT FILE

SDM-100

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SDM/70

GENERAL DOCUMENTATION FORM

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE	TSCA
PART	Hazard Assessment
PHASE	Productional Design
SECTION	G/584/08

GENERAL INFORMATION:

This program reads the Hazard Assessment File created via the terminal input program (G/584/07) and produces the Hazard Assessment Report.

SDM-100

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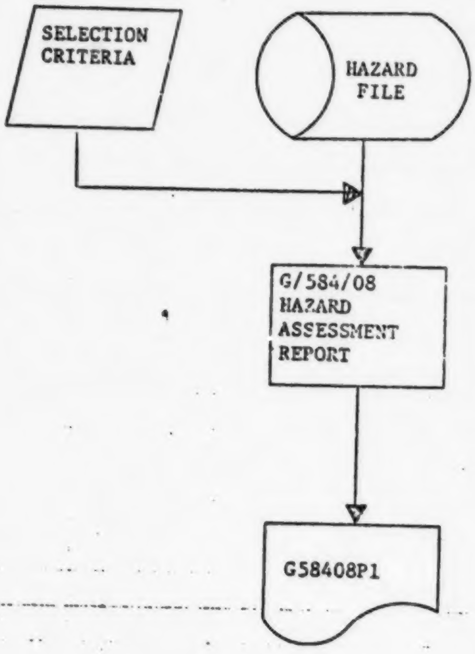
	SDM/70 CHART OR TABLE FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	PART Hazard Assessment
PHASE Productional Design	SECTION G/584/08

NOTES


SELECTION CRITERIA
HAZARD FILE
G/584/08 HAZARD ASSESSMENT REPORT
G58408P1

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2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

The purpose of this program is to read and select data from the Hazard Assessment File (G/584/HAZARD), SORT that data and produce the Hazard Assessment Reports.

REQUESTING DIVISION Environmental Services

SECTION TSCA

UNIT

PRODUCTION CYCLE On Request

SETUP DNR Data Center

PAGES

COPIES

OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
G/584/HAZARD	DNRTOXIC	6	120	C		HAZARD FILE	999
SORT-RECORD	DNRTOXIC		120	C		Selected Records	
G/584/PRINTER	DNRTOXIC		132	C		Hazard Assessment Report	

PROGRAM NAME Hazard Assessment Report 1

APP.

EFFECTIVE DATE

PROGRAM NUMBER G/584/08

[illegible]

SORT MEMORY 18000	SORT DISK SORT DISKPACK	SORT TAPES NA	COMPILER COBOL	C.P.U. TIME 9 seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	G/584/HAZARD	HAZARD-FILE
I/O	DISK	SORT-RECORD	SORT-FILE
OUT	PRINTER	G/584/PRINTER	PRINT-FILE

SPECIAL INSTRUCTIONS

SDM/70

GENERAL OUTPUT DESCRIPTION

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE	TSCA
PART	Hazard Assessment
PHASE	Productional Design
SECTION	G/584/08

IDENTIFICATION

REPORT NO.: G/584/08 **REPORT NAME:** Hazard Assessment Report Form 1 **EXH. NO.:**

TYPE OF REPORT	☐ SUMMARY	☐ EXCEPTION	☒ DETAIL	☐ ERROR	☐ OTHER:
MEDIA OF OUTPUT	☒ PRINTED	☐ CRT	☐ CARD	☐ MICROFILM	☐ OTHER:
FREQUENCY	☐ DAILY	☐ WEEKLY	☐ MONTHLY	☒ ON DEMAND	☐ OTHER:

ACCESS SECURITY	None
OUTPUT CONTENT	Contains a listing of pre-selected chemicals and the scores currently on file for its various properties. Selection criteria is dependant on the intended use as submitted by the requestor.
INTERACTION WITH DISPLAY	None
TOTALS	None
APPROX. SIZE	11" x 8½"
OUTPUT USE	Allow the requestor to zero in on one or more specific scoring catagories and further examine chemicals meeting the criteria
OUTPUT USERS	Office of Toxic Material Control

SDM-400

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Table 15. 1980 Critical Materials Hazard Assessment Summary

Reproduced from best available copy.

THE HAZARD ASSESSMENT PROCESS IS A PRIORITY RANKING - POINT ASSIGNMENT SYSTEM, USED TO EVALUATE CHEMICALS
FOR POSSIBLE INCLUSION ON THE CRITICAL MATERIALS REGISTER. FACTORS OF ENVIRONMENTAL CONCERN FOR
POTENTIALLY DELETERIOUS SUBSTANCES ARE SEPARATED INTO SEVEN SPECIFIC AREAS: 1) ACUTE TOXICITY;
2) CARCINOGENICITY; 3) HEREDITARY MUTAGENICITY; 4) TERATOGENICITY 5) OTHER ADVERSE EFFECTS (INCLUDING
SUBACUTE AND CHRONIC EFFECTS TO TERRESTRIAL AND AQUATIC LIFE, PHYTOTOXICITY AND AESTHETICS); 6) PERSISTENCE;
AND 7) BIOACCUMULATION. THE HAZARD ASSESSMENT PROCESS IS BASED ON EXTENSIVE REVIEW OF THE SCIENTIFIC
LITERATURE ON PHYSICAL, CHEMICAL, AND TOXICOLOGICAL PROPERTIES OF INDUSTRIAL AND AGRICULTURAL CHEMICALS.
CHEMICALS ARE NUMERICALLY SCORED AS TO THEIR HAZARD AND THOSE WHICH POSE A HIGH ENVIRONMENTAL CONCERN
ARE INCLUDED IN THE CRITICAL MATERIAL REGISTER.

A COMPLETE EXPLANATION OF THE CRITICAL MATERIALS REGISTER AND THE HAZARD ASSESSMENT PROGRAM CAN BE FOUND IN THE PUBLICATION, 'CRITICAL MATERIALS REGISTER 1980'. TO OBTAIN A COPY

WRITE:
CRITICAL MATERIALS PROGRAM
MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL SERVICES DIVISION
P. O. BOX 30028
LANSING, MICHIGAN 48909

CALL:
MDNR; OFFICE OF TOXIC MATERIALS CONTROL
(517) 374-9640

* * *

KEY:

ACUTE TOXICITY
- TOT=TOTAL
  - *=INSUFFICIENT INFORMATION
- ORA=ACUTE ORAL TOXICITY
- DER=ACUTE DERMAL TOXICITY
- AQU=ACUTE AQUATIC TOXICITY
- INH=ACUTE INHALATION TOXICITY

H MUT=HEREDITARY MUTAGENICITY
TERT=TERATOGENICITY
BIOA=BIOACCUMULATION
- B=BIOACCUMULATION FACTOR
- P=LOG PARTITION COEFFICIENT
- I=INSUFFICIENT INFORMATION

CARC=CARCINOGENICITY
- HP=HUMAN POSITIVE
- PH=POTENTIAL HUMAN
- AP=ANIMAL POSITIVE
- PA=POTENTIAL ANIMAL
- SS=STRONGLY SUSPECT CARCINOGEN
- SC=SUSPECT CARCINOGEN
- NC=NOT CARCINOGENIC
- II=INSUFFICIENT INFORMATION

PER=PERSISTENCE
- S=SOIL
- W=WATER
- A=AIR
- Q=SOIL, WATER AND AIR
- T=SOIL AND WATER
- N-A=NOT APPLICABLE
- I=INSUFFICIENT INFORMATION

OTHER ADVERSE EFFECTS
- ATE=ADVERSE TERRESTRIAL EFFECT
- AQE=ADVERSE AQUATIC EFFECTS
- APE=ADVERSE PLANT EFFECTS
- AAE=ADVERSE AESTHETIC EFFECTS
- NS=NO SCORE

********** ATTENTION **********

SOME OF THE DATA HAVE BEEN ABBREVIATED ACCORDING TO PROCEDURES GENERALLY ACCEPTED BY THE SCIENTIFIC COMMUNITY DUE TO THE COMPLEX AND HIGHLY TECHNICAL NATURE OF MUCH OF THE INFORMATION. CAREFUL INTERPRETATION OF THE DATA IS ESSENTIAL BEFORE AN ACCURATE HAZARD ASSESSMENT CAN BE MADE. INTERPRETATION OF THE INFORMATION BY INDIVIDUALS NOT EXPERIENCED WITH THIS SUBJECT COULD RESULT IN ERRONEOUS JUDGEMENTS OF THE HAZARDS ASSOCIATED WITH THIS CHEMICAL SUBSTANCE. ALL QUESTIONS ON DATA ACCURACY AND INTERPRETATION SHOULD BE DIRECTED TO THE OFFICE OF TOXIC MATERIALS CONTROL (517) 374-9640.

COMMON CHEMICAL NAME	CAS NUMBER	TOTAL SCORES	ACUTE TOXICITY								OTHER ADVERSE EFFECTS						
			TOT	ORA	DER	AQU	INH	CARCN.	H.MUT	TERT	TOTAL	ATE/	AQU	APE	AAE	PERS	BIOA
Organic Materials																	
carbon tetrachloride	00056235	W-12-4*	2	1	*	2	NS	7-MI	*	*	03-1*	3	*	*	0	*-I	0-B
chlorinated dibenzofurans	Class053	W-07-8*	7	7	*	*	NS	*-II	*	*	NS-3*	*	*	*	*	*-I	*-I
chlorinated dioxins	Class054	W-33-3*	7	7	*	7	NS	1-SC	*	7	07-2*	7	*	*	*	4-S	7-B
1-chloro-2,3-epoxypropane	00106898	W-07-6*	2	2	*	*	NS	*-II	*	*	03-2*	3	*	*	*	0-W	*-I
bis(2-chloroethyl)ether	00111444	W-08-6*	2	2	2	1	NS	3-PA	*	*	03-2*	3	*	*	*	*-I	*-I
chloroform	00067663	W-11-5*	2	1	*	2	NS	7-AP	*	*	02-2*	2	*	*	*	*-I	0-B
bis(2-chloromethyl)ether	00542881	W-10-4*	2	2	2	*	NS	7-HP	*	*	01-2*	1	*	*	*	0-U	0-P
3-(chloromethyl)pyridine hydrochloride	06959484	W-09-7*	2	2	*	*	NS	7-AP	*	*	NS-3*	*	*	*	*	*-I	*-I
1-(4-chlorophenyl)-3,3-dimethyl triazene	07203909	W-07-6*	2	2	*	*	NS	2-SS	*	*	03-2*	3	*	*	*	*-I	*-I
4-chloro-m-phenylenediamine	05131602	W-07-8*	*	*	*	*	NS	7-AP	*	*	NS-3*	*	*	*	*	*-I	*-I
4-chloro-o-phenylenediamine	00095830	W-07-8*	*	*	*	*	NS	7-AP	*	*	NS-3*	*	*	*	*	*-I	*-I
chloroprene	00126995	W-13-5*	2	2	*	2	NS	1-SC	*	7	03-2*	3	*	*	*	*-I	*-I
5-chloro-o-toluidine	C0095794	W-07-6*	2	2	*	*	NS	3-PA	*	*	02-2*	2	*	*	*	*-I	*-I
p-cresidine	00120718	W-08-7*	1	1	*	*	NS	7-AP	*	*	NS-3*	*	*	*	*	*-I	*-I
2,4-diaminoanisole sulfate	39156417	W-11-7*	*	*	*	*	NS	7-AP	4	*	NS-3*	*	*	*	*	*-I	*-I
4,4'-diaminodiphenyl ether	00101804	W-11-6*	1	1	*	*	NS	7-AP	*	*	03-2*	3	*	*	*	*-I	*-I
2,4-diaminotoluene	00095807	W-11-6*	2	2	*	*	NS	7-AP	*	*	02-2*	2	*	*	*	*-I	*-I
dibenz(a,h)anthracene	00053703	W-07-8*	*	*	*	*	NS	7-AP	*	*	NS-3*	*	*	*	*	*-I	*-I
tris(dibromopropyl)phosphate	00126727	W-10-7*	3	*	*	3	NS	7-AP	*	*	NS-3*	*	*	*	*	*-I	*-I
di-n-butyl phthalate	00084742	W-09-6*	7	*	*	7	NS	*-II	*	*	02-2*	2	*	*	*	*-I	0-P
3,3'-dichlorobenzidine	00091941	W-07-7*	*	*	*	*	NS	7-PH	*	*	NS-3*	*	*	*	*	*-I	0-B
3,3'dichlorobenzidine salts	Class088	W-07-7*	*	*	*	*	NS	7-PH	*	*	NS-3*	*	*	*	*	*-I	0-B
1,2-dichloroethane	00107062	W-10-6*	1	1	*	1	NS	7-AP	*	*	02-2*	2	*	*	*	*-I	*-I
1,2:3,4-diepoxybutane	00298180	W-09-7*	2	2	*	*	NS	7-AP	*	*	NS-3*	*	*	*	*	*-I	*-I
diethyl sulfate	00064675	W-08-6*	2	1	1	2	NS	2-SS	4	*	NS-3*	*	*	*	*	*-I	*-I
4-dimethylaminoazobenzene	00060117	W-09-7*	2	2	*	*	NS	7-PH	*	*	NS-3*	*	*	*	*	*-I	*-I
dimethylhydrazines	Class062	W-15-5*	3	3	*	*	NS	7-AP	*	3	02-2*	2	*	*	*	*-I	*-I
4,6-dinitro-o-cresol	00534521	W-07-8*	7	3	3	7	NS	*-II	*	*	NS-3*	*	*	*	*	*-I	*-I
2,4-dinitrophenol	00051285	W-07-6*	3	3	*	3	NS	*-II	*	*	03-1*	*	3	*	1	*-I	*-I
2,4-dinitrotoluene	00121142	W-08-6*	2	2	*	2	NS	3-PA	*	*	03-2*	3	*	*	*	*-I	*-I
di-n-octyl phthalate	00117840	W-09-7*	*	*	*	*	NS	*-II	*	*	02-2*	2	*	*	*	*-I	7-B
1,4-dioxane	00123911	W-10-6*	1	1	0	1	NS	7-AP	*	*	02-6*	2	*	*	*	*-I	*-I
2,3-epoxy-1-propanal	00765344	W-08-6*	2	*	2	*	NS	3-PA	*	*	03-2*	3	*	*	*	*-I	*-I
ethylene dibromide	00106934	W-11-6*	2	2	2	2	NS	7-AP	*	*	02-2*	2	*	*	*	*-I	*-I
ethyleneimine	00151564	W-17-4*	7	7	3	*	NS	7-PH	*	*	03-2*	3	*	*	*	0-U	0-P
ethylene oxide	00075218	W-10-2*	2	2	*	2	NS	2-SC	4	*	02-1*	2	*	*	0	0-H	0-P
ethylene thiourea	00096457	W-16-6*	*	*	*	*	NS	7-AP	*	7	02-2*	2	*	*	*	*-I	*-I
bis(2-ethylhexyl)phthalate	00117817	W-09-5*	*	*	*	*	NS	0-UC	*	*	07-2*	7	7	*	*	0-U	2-B
ethylmethanesulfonate	00062500	W-10-6*	*	*	*	*	NS	2-SC	7	*	01-2*	1	*	*	*	*-I	*-I
2-(2-formylhydrazine)-4-(5-nitro-2-furyl) thiazole	03570750	W-07-8*	*	*	*	*	NS	7-AP	*	*	NS-3*	*	*	*	*	*-I	*-I
hexachlorobenzene (HCB)	00118741	W-25-2*	1	1	*	*	NS	3-PA	*	7	03-1*	3	*	*	0	4-S	7-P
hexachlorobutadiene	00087683	W-12-5*	7	2	*	7	NS	3-PA	*	*	02-1*	2	*	*	0	*-I	*-I
hexachlorocyclohexane	00608731	W-20-5*	7	2	*	7	NS	7-AP	*	*	02-2*	2	*	*	*	4-S	*-I
hexachlorocyclopentadiene	00077474	W-11-5*	7	2	*	7	NS	*-II	*	*	02-1*	2	*	*	1	*-I	1-B
hexachloroethane	00067721	W-07-6*	1	1	*	*	NS	3-PA	*	*	03-2*	3	*	*	*	*-I	*-I

	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G/584
		DATE	02/02/82

SYSTEM TITLE TSCA	PART Hazardous Assessment
PHASE Productional Design	SECTION G/584/09

G/584/09

HAZARD ASSESSMENT
FILE REORGANIZATION

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SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G/584
	DATE	2/02/82

SYSTEM TITLE TSCA	**PART** Hazardous Assessment
PHASE Productional Design	**SECTION** G/584/09

GENERAL INFORMATION:

This program will simply read the hazard assessment file created via the terminal input program G/584/07 and write it back out. By doing this the overflow areas will be removed and response time for program C/584/07 will increase.

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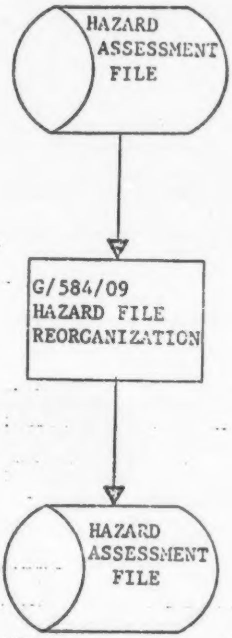
	SDM/70 CHART OR TABLE FORM	PROJECT NUMBER	G/584/09
		DATE	02/02/82

SYSTEM TITLE TSCA	**PART** Hazardous Assessment
PHASE Productional Design	**SECTION.** G/584/09


HAZARD ASSESSMENT FILE
G/584/09 HAZARD FILE REORGANIZATION
HAZARD ASSESSMENT FILE

NOTES

SDM-101

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2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

The purpose of this program is to reorganize the Hazard Assessment File.

REQUESTING DIVISION Environmental Services

SECTION TSCA

UNIT

PRODUCTION CYCLE On request

SETUP DNR Data Center

PAGES

COPIES

OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
G/584/HAZARD	DNRTOXIC	6	120	C		OLD MASTER	
G/584/HAZARD	DNRTOXIC	6	120	C		NEW MASTER	

PROGRAM NAME Reorganize Hazard Assessment File

APP.

EFFECTIVE DATE

PROGRAM NUMBER G/584/09

[illegible]

SORT MEMORY NA	SORT DISK NA	SORT TAPES. NA	COMPILER COBOL	C.P.U. TIME 2 SECONDS

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	G/584/HAZARD	IN-HAZARD-FILE
OUT	DISK	G/584/HAZARD	OT-HAZARD-FILE

SPECIAL INSTRUCTIONS

SDM/70

GENERAL
DOCUMENTATION FORM

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE TSCA	PART Priority Ranking
PHASE Productional Design	SECTION

The need has been identified to prioritize facilities and wastewater treatment plants within the state of Michigan according to their potential for causing environmental damage.

A set of numerical calculations was developed to appraise facilities based on their usage and/or discharge of critical materials. Using this process, points are computed for several categories and a weighted factor is assigned to make up hazard scores.

The objective of this system is to support and maintain the data bank of supplemental information. Using this information and the predefined scoring process, this system will appraise and rank pre-selected facilities and wastewater treatment plants according to their activities with critical materials.

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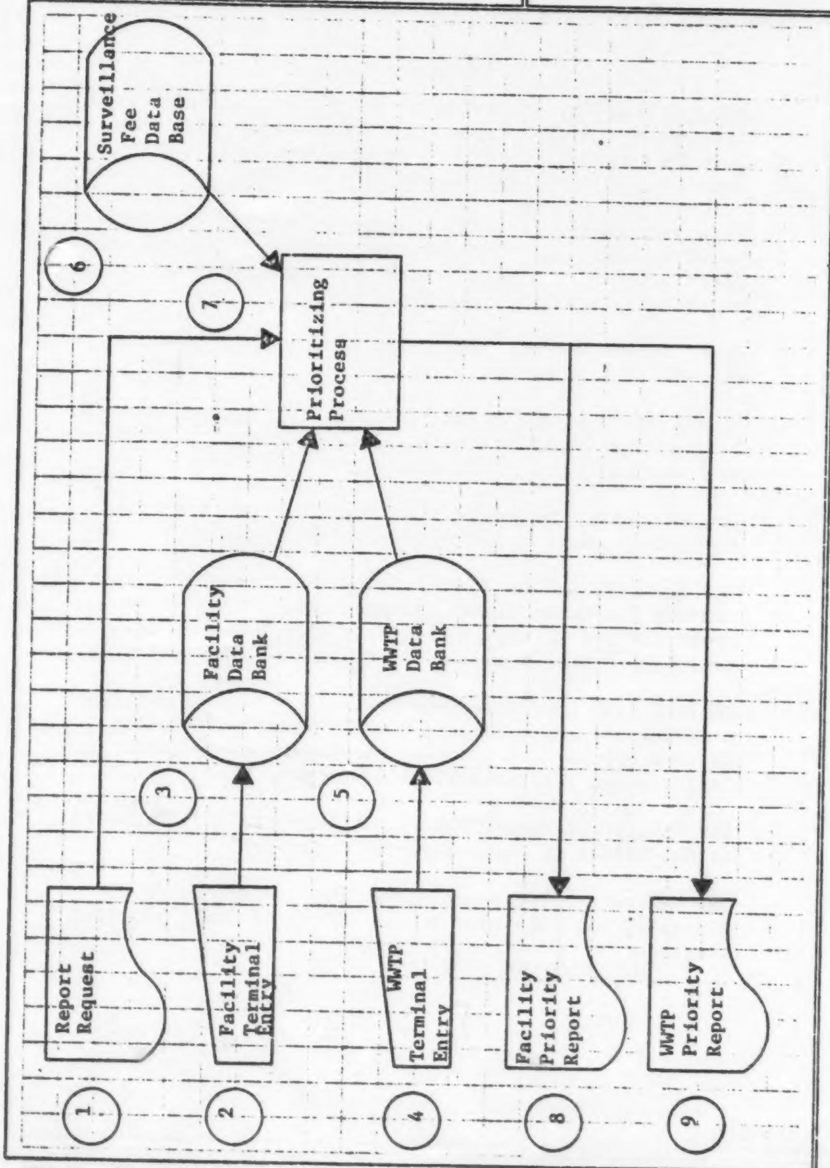
	SDM/70 CHART OR TABLE FORM	**PROJECT NUMBER**	G584
		DATE	2-1-82
		PAGE	

SYSTEM TITLE TSCA	**PART** Priority Ranking
PHASE Productional Design	**SECTION** Functional Flow



Surveillance Fee Data Base
6
7
Prioritizing Process
Facility Data Bank
3
WWTP Data Bank
5
Report Request
Facility Terminal Entry
WWTP Terminal Entry
Facility Priority Report
WWTP Priority Report
1
2
4
8
9

NOTES

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	**PART** Priority Ranking
PHASE Productional Design	**SECTION** Functional Design

Refer to functional flow diagram for reference charting.

Step	Description
1.	After a need for the prioritizing process has been identified the TSCA Report·Request Form is completed. Selection criteria and sort options are indicated depending on the intended use of the report.
2.	Supplemental facility information is entered through terminal sessions. Data includes values necessary for the prioritizing process which were not available on the existing Surveillance Fee DataBase.
3.	The facility information is stored for use by the prioritizing process.
4.	Wastewater Treatment Plant terminal entries are entered. Information includes treatment plant level data which was previously not available.
5.	The wastewater treatment plant information is stored for future usage by the prioritizing process.
6.	The Surveillance Fee System is the main source of data used by the prioritizing process. Facilities to be processed are extracted from this file based on the selection criteria on the Report request form (step 1).
7.	Pre-selected facilities are evaluated based on critical material use and discharge. A numerical calculation is then applied and priority scores are assigned to each facility and treatment plant selected.
8.	The Facility Priority Report is generated and forwarded to the Office of Toxic Material Control.
9.	The Wastewater Treatment Plant Priority Report is generated and forwarded to the Office of Toxic Material Control.

SDM-100

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA

PART Priority Ranking

PHASE Productional Design

SECTION G/584/14

G/584/14

BUILD WASTEWATER TRANSACTIONS

SDM-100 THIS FORM IS AN INTEGRAL PART OF A PROPRIETARY PRODUCT FROM KATCH & ASSOCIATES AND ATLANTIC SOFTWARE, INC. ITS USE AND REPRODUCTION IS PERMITTED ONLY WITHIN THE INSTALLATION LICENSED TO USE THIS PRODUCT

SDM/70

GENERAL DOCUMENTATION FORM

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/14

A. GENERAL INFORMATION:

The purpose of this program is to interact with a terminal operator to build the Wastewater Master Transaction File (DATA/G/584/TRANS).

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SDM/70

CHART OR TABLE FORM

PROJECT NUMBER G/584

DATE 02/02/82

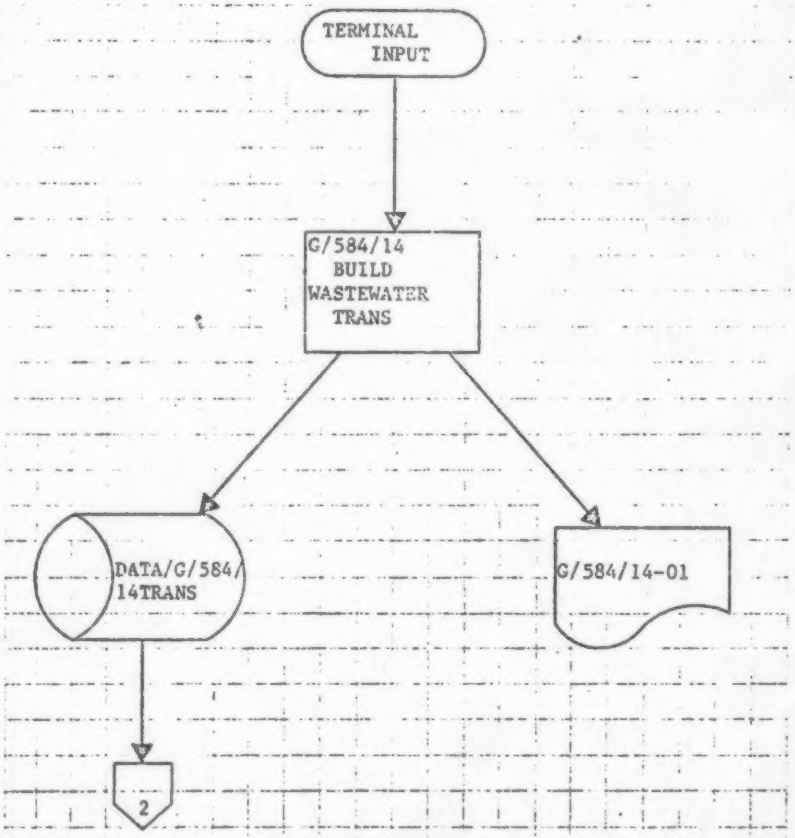
SYSTEM TITLE TSCA

PART Hazardous Assessment

PHASE Productional Design

SECTION G/584/14

NOTES


TERMINAL INPUT
G/584/14 BUILD WASTEWATER TRANS
DATA/G/584/14TRANS
G/584/14-01
2

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ITS USE AND REPRODUCTION IS PERMITTED ONLY WITHIN THE INSTALLATION LICENSED TO USE THIS PRODUCT.

2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

The purpose of this program is to interact with a terminal operator to build the Wastewater Master Transaction File (DATA/G/584/TRANS).

REQUESTING DIVISION Environmental Services
SECTION TSCA
UNIT

PRODUCTION CYCLE On Request
SETUP DNR Data Center
PAGES
COPIES
OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
G/584/07/FORMS	DNRTOXIC					FORMS	
DATA/G/584/TRANS	DNRTOXIC	5	70	C		TRANSACTION FILE	
G/584/PRINTER	DNRTOXIC		132	C		PRINT FILE (G/584/14-01)	

PROGRAM NAME Build Wastewater Trans
APP.
EFFECTIVE DATE
PROGRAM NUMBER G/584/14

[illegible]

SORT MEMORY	NA	SORT DISK	NA	SORT TAPES	NA	COMPILER	COBOL	C.P.U. TIME	10 seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	DATA/G/584/14TRANS	TRANS-FILE
OUT	PRINTER	G/584/PRINTER	PRINT-HER

SPECIAL INSTRUCTIONS

SDM/70

GENERAL OUTPUT DESCRIPTION

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE TSCA	PART Priority Ranking
PHASE Productional Design	SECTION G/584/14

IDENTIFICATION

REPORT NO: G/584/14-01 REPORT NAME: Wastewater Transaction Listing EXH. NO.: III-A

TYPE OF REPORT	☐ SUMMARY	☐ EXCEPTION	☒ DETAIL	☐ ERROR	☐ OTHER:
MEDIA OF OUTPUT	☒ PRINTED	☐ CRT	☐ CARD	☐ MICROFILM	☐ OTHER:
FREQUENCY	☐ DAILY	☐ WEEKLY	☐ MONTHLY	☒ ON DEMAND	☐ OTHER:

ACCESS SECURITY	none
OUTPUT CONTENT	lists each successfully completed transaction for a on-line-terminal session. All information entered is printed to be used for data verification and referencing.
INTERACTION WITH DISPLAY	none
TOTALS	the following totals are printed 1) add transactions 2) change transactions 3) delete transactions
APPROX. SIZE	11 x 14.5 inches
OUTPUT USE	provide a listing of all transactions and the data entered for tracebacks and verification of data entries.
OUTPUT USERS	Office of Toxic Material Control (1 copy)

SDM-400

[illegible]

```
G/584/
RUNDA     07/06/81                 MICHIGAN DEPARTMENT OF NATURAL RESOURCES                              PAGE     1
                                     BUREAU OF ENVIRONMENT PROTECTION
                                     WASTEWATER TRANSACTION LISTING

  TRAN                                             GROUNDWATER     <--------- W W T P --------->     TRAN
  SEQ    TYP   CO     FAC NAME      FAC NO     ST.   WS.   SW.    INFL. VOL    REC DR    SAN SEW

    1     A    75    GF BUSINES     750106            0     0     000001.6     000026    750034
    2     A    76    YALE RUBBE     760049            0     0     000000.0     000000    760033
    3     A    76    DUTT MANUF     760076      P     0     0     000000.4     000001    760074
    4     A    78    OWOSSO GRA     780009      P     0     0     000000.0     000000    000000
    5     A    78    UNIVERSAL      780044            0     0     000002.8     000021    780019
    6     A    78    TOLEDO COM     780075            0     0     000002.8     000021    780019
    7     A    79    VASSAR MAN     790033            0     0     000000.7     000010    790010
    8     A    79    BROOKS & P     790068      P     0     0     000000.4     000010    790006
    9     A    80    WARNER VIN     800031            0     0     000000.2     000015    800060
   10     A    80    ST. JULIAN     800120            0     0     000000.2     000015    800060
   11     A    80    BOHN ALUMI     800126            0     0     000001.9     000056    800059
   12     A    80    CONTROLLED     800184      S     0     0     000001.9     000056    800059
   13     A    81    EDWARDS        810207            0     0     000033.7     000035    810039
   14     A    82    PARKE DAVI     820118            0     0     001934.5     076874    820214
   15     A    50    CREATIVE       990051            0     0     000029.2     000001    500052
   16     A    82    REDI-STRIP     990067            0     0     001934.5     076874    820214
   17     A    82    FILM CRAFT     990290            0     0     001934.5     076874    820214
   18     A    41    HEIRLOOM       990293            0     0     000049.8     000471    410032
   19     A    82    NORTH AMER     990306            0     0     001934.5     076674    820214
   20     A    25    W  S. LAB      990357            0     0     000033.2     000026    250022
   21     A    63    GROW GROUP     990427            0     0     001934.5     076874    820214
   22     A    63    SURFACE IN     990490            0     0     001934.5     076874    820214
   23     A    47    COUNTRY        990689            0     0     001934.5     076874    820214
   24     A    41    KENTWOOD       990696            0     0     000049.8     000471    410032
   25     A    82    PROGRESS       990710            0     0     001934.5     076874    820214
   26     A    59    CARSON CIT     990754            0     0     000000.1     000016    590020
   27     A    21    KJS POLY       990783            0     0     000001.0     645999    240021
   28     A    25    CALLAHAN       990784            0     0     000033.2     000026    250022
   29     A    22    TWIN CITY      990789            0     0     000001.5     000495    220012
   30     A    33    LAUNDERWEL     990796            0     0     000025.0     000048    330013
   31     A    21    ONE HOUR       990814            0     0     000001.7     645999    210037
   32     A    75    ONE HOUR       990818            0     0     000001.9     000000    110158
   33     A    30    HIR DIVISI     990823            0     0     000001.5     000001    300019
   34     A    61    ANACONDA       990864            0     0     000036.0     000002    610245
   35     A    63    DON AL INC     990869            0     0     001934.5     076874    820214
   36     A    82    ESSEX GROU     990881            0     0     001934.5     076874    820214
   37     A    70    X-RAY INDU     990890      U     0     0     000000.0     000000    000000
   38     A    63    ONE HOUR       990891            0     0     001934.5     076874    820214
   39     A    58    KALAMAZOO      990892            0     0     000030.3     000202    390051

                 TOTAL TRANSACTIONS---ADDS    39  CHANGES     0  DELETES     0
```

```
FORM NUMBER: 4
      DATE: 6/01/81
      TIME: 10:16

    LEGEND: P =  START PROTECT          [ =  START BLINK          B = START REVERSE
            Q =    END PROTECT          ] =    END BLINK          Q =   END REVERSE

    ....*....1....*....2....*....3....*....4....*....5....*....6....*....7....*....8
01 |P                                                                               | 01     00
02 |                                                                                | 02     00
03 |                                                                                | 03     00
04 |                                                                                | 04     00
05 |               PLACE AN -X- IN THE SPACES PROVIDED RO INDICATE                  | 05     00
06 |                 THE TYPE OF ENTRIES YOU ARE ABOUT TO ENTER.                    | 06     00
07 |                     (ONLY ONE BOX MAY BE CHECKED)                              | 07     00
08 |                                                                                | 08     00
09 |                                                                                | 09     00
10 |                      Q_PFACILITY WASTEWATER INFORMATION                        | 10     01
11 |                      Q_PW.W.T.P. INFORMATION                                   | 11     01
12 |                                                                                | 12     00
13 |                                                                                | 13     00
14 |                                                                                | 14     00
15 |                     DO YOU WANT A TRANSACTION LISTING?Q_P                      | 15     01
16 |                        (Y=YES  N=NO)                                           | 16     00
17 |                                                                                | 17     00
18 |                                                                                | 18     00
19 |                                                                                | 19     00
20 |                                          HAVE FUN! Q P                         | 20     01
21 |                                                                                | 21     00
22 |                                                                                | 22     00
23 |                                                                                | 23     00
24 |                                                                                | 24     00
    ....*....1....*....2....*....3....*....4....*....5....*....6....*....7....*....8

                                                          TOTAL NON-PROTECTED POSITIONS 0004
```

```
  FORM FILE: G/584/07/FORMS
FORM NUMBER: 3
       DATE: 5/11/81
       TIME: 17:16

     LEGEND: P = START PROTECT          [ = START BLINK          R = START REVERSE
             e =   END PROTECT          ] =   END BLINK          Ω =   END REVERSE

    ....*....1....*....2....*....3....*....4....*....5....*....6....*....7....*....8
01 IE                                                                                I 01    00
02 I                                   WASTEWATER FORMS UPDATE                       I 02    00
03 ITYPE:R      Ω                      R                      -Ω                     I 03    03
04 ICC:e__P                                                                          I 04    02
05 IFACILITY NAME:e__________P                                                       I 05    10
06 IFACILITY NO  :e______P                                                           I 06    06
07 I                                                                                 I 07    00
08 I**GROUND WATER (TYPE 2 3 4 6)**                                                  I 08    00
09 I                                                                                 I 09    00
10 I             SOIL TYPE:e_P                                                       I 10    01
11 I                            <=========PLACE -X- IN PROPER OPTION=========>      I 11    00
12 I             WELL DISTANCE e_P>1 MILE     e_P1/4 - 1 MILE   e_P<1/4 MILE        I 12    03
13 I             SURFACE WATER e_P>1 MILE     e_P1/4 - 1 MILE   e_P<1/4 MILE        I 13    03
14 I                                                                                 I 14    00
15 I                                                                                *I 15    00
16 I*SANITARY SEWER (TYPE 8)**                                                       I 16    00
17 I            INFLUENT VOL:e______P.e_P                                            I 17    07
18 I            R.S.C.F     :e______P                                                I 18    06
19 I            SAN.SEWER NO:e______P                                                I 19    06
20 I                                                                                 I 20    00
21 I                                                                                 I 21    00
22 I                                                                                 I 22    00
23 I                                                                                 I 23    00
24 I                                                                                 I 24    00
    ....*....1....*....2....*....3....*....4....*....5....*....6....*....7....*....8

                                                      TOTAL NON-PROTECTED POSITIONS 0044
```

```
[illegible]
FORM NUMBER: 5
      DATE: 6/01/81
      TIME: 10:16

    LEGEND: P =  START PROTECT          [ =  START BLINK            R =  START REVERSE
            e =    END PROTECT          ] =    END BLINK            Q =    END REVERSE

    ....*....1....*....2....*....3....*....4....*....5....*....6....*....7....*....8
 01 IP                                                                               I 01    00
 02 I                       WASTEWATER TREATMENT PLANT UPDATE                        I 02    00
 03 ITYPE:P      Q               R                    Q                              I 03    00
 04 I                                                                                I 04    00
 05 I                                                                                I 05    00
 06 I                                                                                I 06    00
 07 I                                                                                I 07    00
 08 I                        PLANT NO:e______P                                       I 08    06
 09 I                        PLANT NAME:e____________________P                       I 09    20
 10 I                        DESIGN USE OF RECEIVING STREAM:e__P                     I 10    02
 11 I                        LOCATION CODE:e________P                                I 11    08
 12 I                                                                                I 12    00
 13 I                                                   e P                          I 13    01
 14 I                                                                                I 14    00
 15 I                                                                                I 15    00
 16 I                                                                                I 16    00
 17 I                                                                                I 17    00
 18 I                                                                                I 18    00
 19 I                                                                                I 19    00
 20 I                                                                                I 20    00
 21 I                                                                                I 21    00
 22 I                                                                                I 22    00
 23 I                                                                                I 23    00
 24 I                                                                                I 24    00
    ....*....1....*....2....*....3....*....4....*....5....*....6....*....7....*....8
                                                              TOTAL NON-PROTECTED POSITIONS 0037
```

	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/15

G/584/15

UPDATE WASTEWATER MASTER

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/15

GENERAL INFORMATION:

This program updates the Wastewater Master file using transaction records created in program G/584/14.

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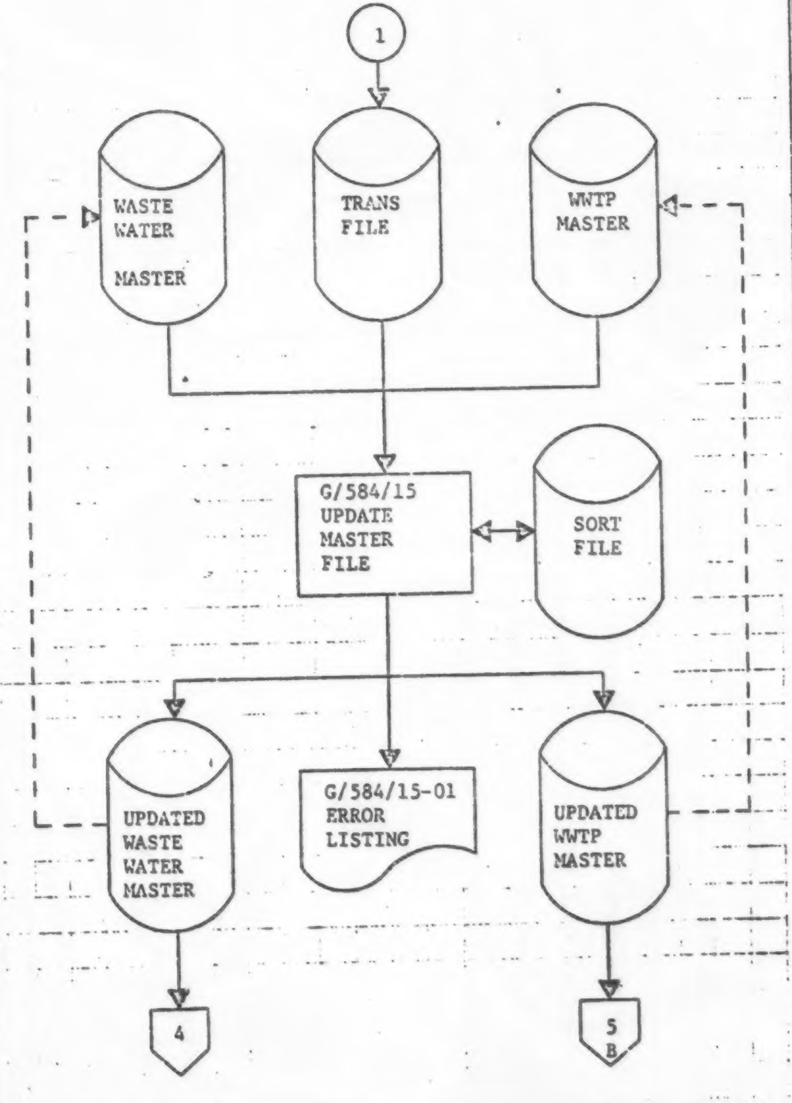
SDM/70 CHART OR TABLE FORM	PROJECT NUMBER	G584
	DATE	2/1/82

SYSTEM TITLE TSCA	PART Priority Ranking
PHASE Productional Design	SECTION G/584/15

NOTES


1
WASTE WATER MASTER
TRANS FILE
WWTP MASTER
G/584/15 UPDATE MASTER FILE
SORT FILE
UPDATED WASTE WATER MASTER
G/584/15-01 ERROR LISTING
UPDATED WWTP MASTER
4
5 B

SDM-101

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2567 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

The purpose of this program is to update the Wastewater Master file using transaction records from G/584/14.

REQUESTING DIVISION Environmental Services	SECTION TSCA		UNIT
PRODUCTION CYCLE On Request	SETUP DNR Data Center	PAGES	COPIES	OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
DATA/G/584/14TRANS	DNRTOXIC	5	70	C		Transaction file	
DATA/G/584/15WATMST	DNRTOXIC	5	70	C		Master file	
G/584/PRINTER	DNRTOXIC		132	C		Error Listing	
DATA/G/584/15WWTP	DNRTOXIC	5	54			WWTP Master file	

PROGRAM NAME Update Wastewater Master	APP.	EFFECTIVE DATE	PROGRAM NUMBER G/584/15

[illegible]

SORT MEMORY NA	SORT DISK NA	SORT TAPES . NA	COMPILER COBOL	C.P.U. TIME 10 Seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK		TRANS-FILE
IN	DISK	DATA/G/584/15WATMST	IN-MSTR-FILE
IN	DISK		IN-PLANT-FILE
OUT	PRINTER		PRINT-HER
OUT	DISK		OUT-MSTR-FILE
OUT	DISK		OUT-PLANT-FILE

SPECIAL INSTRUCTIONS

SDM/70 GENERAL OUTPUT DESCRIPTION	PROJECT NUMBER	G584
	DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/15

REPORT NO.: G/584/15-01 REPORT NAME: Transaction Error Summary EXH. NO.: III-B

IDENTIFICATION					
TYPE OF REPORT	☒ SUMMARY	☐ EXCEPTION	☐ DETAIL	☐ ERROR	☐ OTHER:
MEDIA OF OUTPUT	☒ PRINTED	☐ CRT	☐ CARD	☐ MICROFILM	☐ OTHER:
FREQUENCY	☐ DAILY	☐ WEEKLY	☐ MONTHLY	☒ ON DEMAND	☐ OTHER:

ACCESS SECURITY	none
OUTPUT CONTENT	contains any transactions listed on report G/584/14 which cannot be applied to the ~~wastewater~~ master file. Program control information is also printed
INTERACTION WITH DISPLAY	None
TOTALS	following are printed A) facilities added to the ~~Wastewater~~ Master B) facilities changed on the ~~Wastewater~~ Master C) facilities deleted from the ~~Wastewater~~ Master D) transactions in error at time of update
APPROX. SIZE	11 x 14.5 inches
OUTPUT USE	to be used in conjunction with report G/584/14 to determine cause for any transactions found in error and resolve. Serves as a balancing tool between transactions and completed updates
OUTPUT USERS	Office of Toxic Material Control (1 copy)

SDM-400

[illegible]

```
G/584/15-01                      MICHIGAN DEPARTMENT OF NATURAL RESOURCES                     PAGE     1
RUN DATE 11/25/81                         WASTEWATER FILE UPDATE
                                         TRANSACTION ERROR SUMMARY

    INPUTTED TRANSACTION DATE-S 112581

    *** NO ERRORS DETECTED FOR THIS UPDATE ***

    TOTAL TRANSACTIONS--  ADDS    0  CHANGES    4  DELETES    0  ERRORS    0
```

	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/16

G/584/16

MERGE AND EDIT

SDM-100

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SDM/70

GENERAL DOCUMENTATION FORM

PROJECT NUMBER	G584		
DATE	2/1/82		
SYSTEM TITLE	TSCA	**PART**	Priority Ranking
PHASE	Productional Design	**SECTION**	G/584/16

GENERAL INFORMATION:

This program merges information from four input files. One calculation record is written for each critical material for a pre-selected facility.

THIS FORM IS AN INTEGRAL PART OF A PROPRIETARY PRODUCT FROM KATCH & ASSOCIATES AND ATLANTIC SOFTWARE, INC
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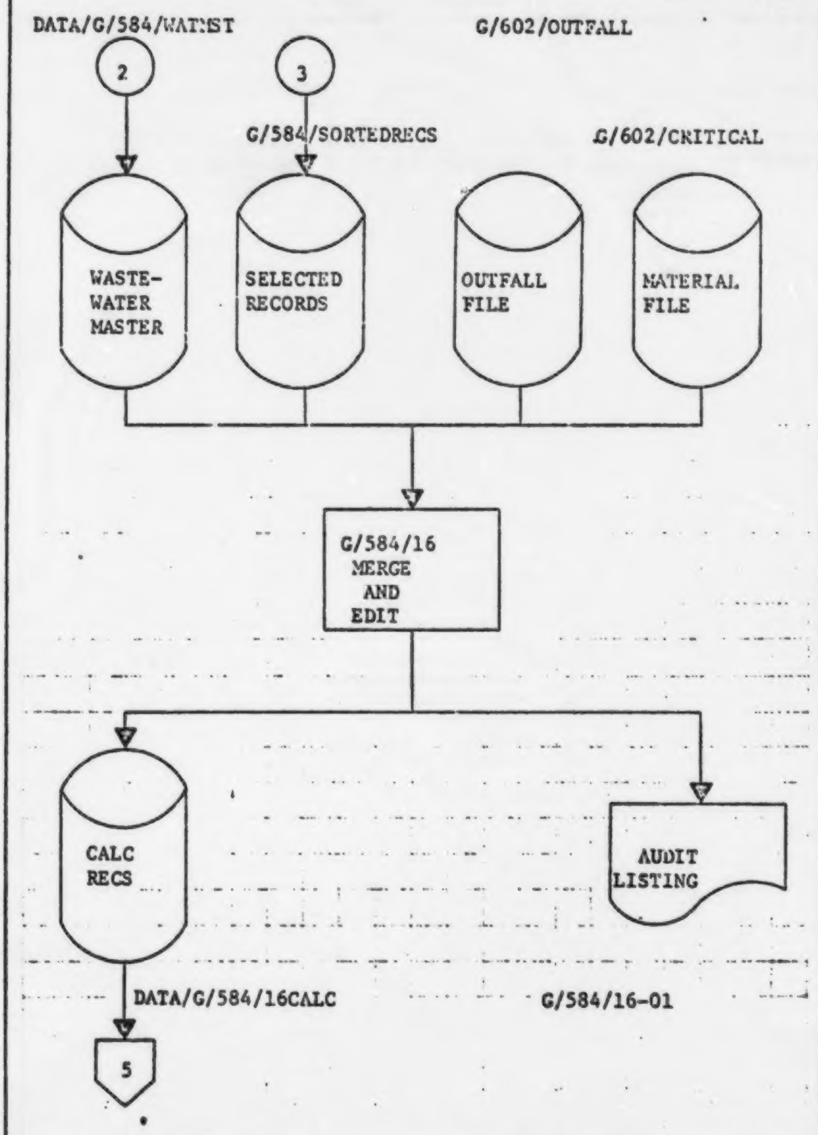
	SDM/70 CHART OR TABLE FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	PART Priority Ranking
PHASE Productional Design	SECTION G/584/16



DATA/G/584/WATMST
2
3
G/602/OUTFALL
G/584/SORTEDRECS
G/602/CRITICAL
WASTE-WATER MASTER
SELECTED RECORDS
OUTFALL FILE
MATERIAL FILE
G/584/16 MERGE AND EDIT
CALC RECS
AUDIT LISTING
DATA/G/584/16CALC
G/584/16-01
5

NOTES

SDM-101

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2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

This program merges information from 4 input files. One calculation record is written for each critical material for a pre-selected facility.

REQUESTING DIVISION	Environmental Services	SECTION	TSCA	UNIT	
PRODUCTION CYCLE	On Request	SETUP	DNR Data Center	PAGES	
COPIES		OVERLAY ID			

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
G/584/SORTEDRECS	DNRTOXIC	6	120	C		Selected Records	
G/584/PRINTER	DNRTOXIC		132	C			
G/602/CRITICAL	DNR	3	480	C		Critical Material File	
G/602/OUTFALL	DNR	3	120	C		Outfall File	
DATA/G/584/15WATMST	DNR	5	70	C		Wastewater Master	
DATA/G/584/16CALC	DNR	6	210	C		Calculation File	

PROGRAM NAME	Merge and Edit	APP.		EFFECTIVE DATE		PROGRAM NUMBER	G/584/16

RT EMORY NA	SORT DISK NA	SORT TAPES NA	COMPILER COBOL	C.P.U. TIME 15 Seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	G/584/SORTEDRECS	SEL-FILE
IN	DISK	G/602/CRITICAL	CRITICAL-FILE
IN	DISK	G/602/OUTFALL	OUTFALL-FILE
IN	DISK	DATA/G/584/15WATMST	WASTEWATER-FILE
OUT	DISK	DATA/G/584/16CALC	CALC-FILE
OUT	PRINTER	G/584/PRINTER	PRINT-HER

SPECIAL INSTRUCTIONS

	SDM/70 GENERAL OUTPUT DESCRIPTION	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	**PART** Priority Ranking
PHASE Productional Design	**SECTION** G/584/16

IDENTIFICATION

REPORT NO.: G/584/16-01 **REPORT NAME:** Data Audit **EXH. NO.:** III-C

TYPE OF REPORT	☐ SUMMARY	☐ EXCEPTION	☐ DETAIL	☒ ERROR	☐ OTHER:
MEDIA OF OUTPUT	☒ PRINTED	☐ CRT	☐ CARD	☐ MICROFILM	☐ OTHER:
FREQUENCY	☐ DAILY	☐ WEEKLY	☐ MONTHLY	☒ ON DEMAND	☐ OTHER:

ACCESS SECURITY	None
OUTPUT CONTENT	contains facility and critical material numbers for any facility whose information proves to be missing or incorrect for the calculation processes performed by the following program
INTERACTION WITH DISPLAY	None
TOTALS	None
APPROX. SIZE	8.5 x 11 inches
OUTPUT USE	used in conjunction with G/584/18 to describe in detail the reason why a calculated total discharge score may be incorrect
OUTPUT USERS	Office of Toxic Material Control (1 copy)

SDM-400

THIS FORM IS AN INTEGRAL PART OF A PROPRIETARY PRODUCT FROM [illegible] ASSOCIATES AND ATLANTIC SOFTWARE, INC. ITS USE [illegible] IS PERMITTED ONLY WITHIN THE INSTALLATION LICENSED TO USE THIS PRODUCT

```
G/584/16-01                          MICHIGAN DEPARTMENT OF NATURAL RESOURCES                                   PAGE    1
RUN DATE 05/12/81                       BUREAU OF ENVIRONMENT PROTECTION
                                        DATA AUDIT FOR REPORT REQUEST 234

          FAC NO            CM NUMBER            ACTION             REASON FOR CONCERN

          300013            CLASS014             CONTINUED          SANITARY SEWER INFLUENT VOLUME = 0000000
          330034            CLASS027             TYPE = 5           MISSING WASTEWATER RECORD
          390031            CLASS020             CONTINUED          2 OUTFALLS TYPE1-DIFFERENT DROUGHT FLOWS
          390031            CLASS020             CONTINUED          2 OUTFALLS TYPE1-DIFFERENT DESIGN CODES
          390031            CLASS027             TYPE = 5           NO OUTFALL INFO FOR GPS NO 004
          390031            CLASS022             TYPE = 5           NO OUTFALL INFO FOR GPS NO 004
          390031            CLASS020             TYPE = 5           NO OUTFALL INFO FOR GPS NO 004
          390031            CLASS017             TYPE = 5           NO OUTFALL INFO FOR GPS NO 004
          390031            CLASS017             TYPE = 5           NO OUTFALL INFO FOR GPS NO 006
          390031            CLASS017             TYPE = 5           NO OUTFALL INFO FOR GPS NO 007
          390031            CLASS017             TYPE = 5           NO OUTFALL INFO FOR GPS NO 008
          390031            CLASS015             TYPE = 5           NO OUTFALL INFO FOR GPS NO 004
          390051            07782505             TYPE = 5           NO OUTFALL INFO FOR GPS NO 004
          390031            07782505             TYPE = 5           NO OUTFALL INFO FOR GPS NO 007
          390031            07782505             TYPE = 5           NO OUTFALL INFO FOR GPS NO 008
          390172            CLASS023             TYPE = 5           NO OUTFALL INFO FOR GPS NO 025
          390172            CLASS020             TYPE = 5           NO OUTFALL INFO FOR GPS NO 025
          390172            CLASS017             TYPE = 5           NO OUTFALL INFO FOR GPS NO 005
          390172            00302012             TYPE = 5           NO OUTFALL INFO FOR GPS NO 025
          390172            CLASS027             TYPE = 5           NO OUTFALL INFO FOR GPS NO 005
          390172            CLASS024             TYPE = 5           NO OUTFALL INFO FOR GPS NO 025
```

SDM/70

GENERAL DOCUMENTATION FORM

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/17

G/584/17

PRIORITY RANKING CALCULATOR

SDM-100

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE TSCA	PART Priority Ranking
PHASE Productional Design	SECTION G/584/17

GENERAL INFORMATION:

This program performs a series of arithmetic operations for each critical material reported by pre-selected facilities., Four scores are calculated producing one record per facility.

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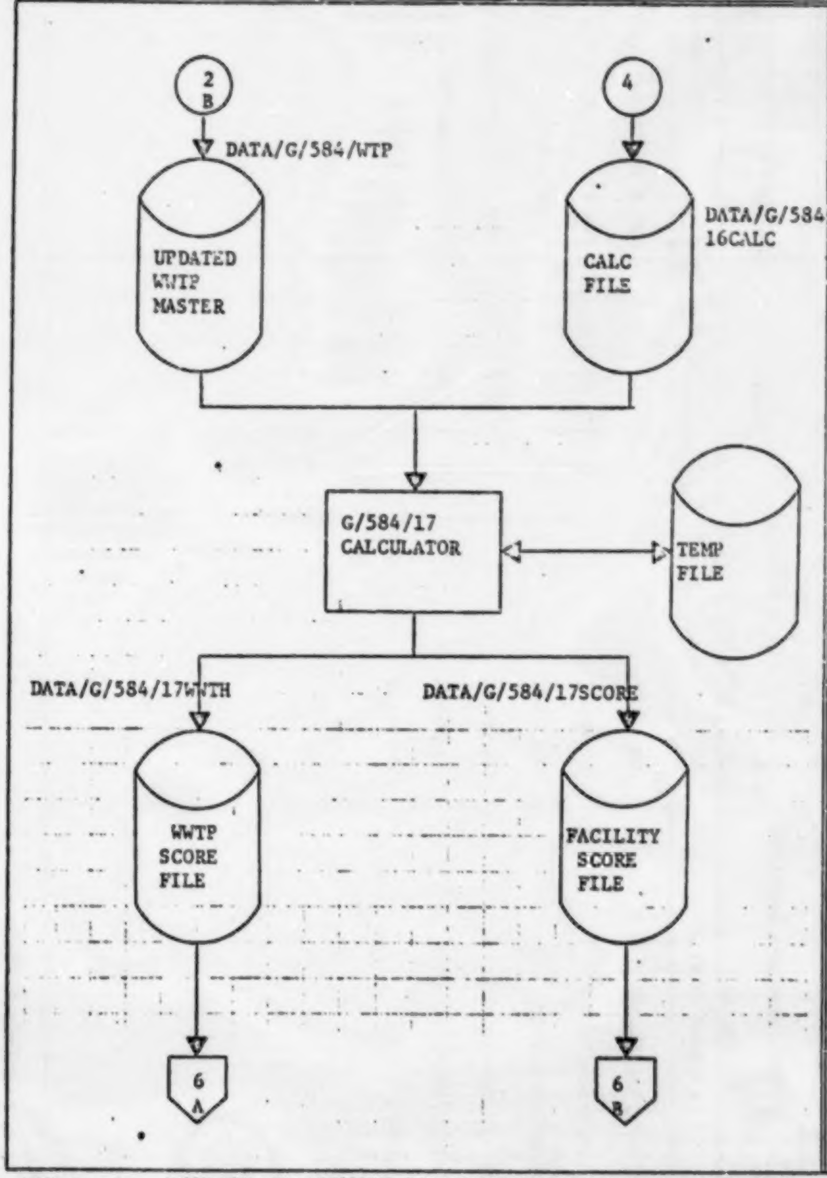
	SDM/70 CHART OR TABLE FORM	PROJECT NUMBER	G584
		DATE	2/1/82
			1

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/17


2
B
DATA/G/584/WTP
UPDATED WWTP MASTER
4
DATA/G/584/16CALC
CALC FILE
G/584/17 CALCULATOR
TEMP FILE
DATA/G/584/17WWTH
DATA/G/584/17SCORE
WWTP SCORE FILE
FACILITY SCORE FILE
6
A
6
B

NOTES

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2367 (2/79)

PROGRAM ABSTRACT

DESCRIPTION

This program performs a series of arithmetic operations for each critical material reported by pre-selected facilities. Four scores are calculated producing 1 record per facility.

REQUESTING DIVISION Environmental Services	SECTION TSCA	UNIT
PRODUCTION CYCLE On Request	SETUP DNR Data Center	PAGES
COPIES	OVERLAY ID	

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
DATA/G/584/15WWTD	DNRTOXIC	5	54	C		WWTP MASTER-FILE	999
DATA/G/584/17WWTD	DNRTOXIC	6	60	C		WWTP SCORE FILE	999
DATA/G/584/TEMP	DNRTOXIC	10	42	C		WORK FILE	999
DATA/G/584/16CALC	DNRTOXIC	6	210	C		CALCULATION FILE	999
DATA/G/584/17SCORE	DNRTOXIC	10	100	C		SCORE FILE-FACILITY	30
SORT-FILE	DNRTOXIC		42	C		SORTED FILE	

C.4.24

PROGRAM NAME Priority Ranking Calculator	APP.	EFFECTIVE DATE	PROGRAM NUMBER G/584/17

167-R [illegible] 9'76)

ORT EMORY	SORT DISK DISKPACK	SORT TAPES	COMPILER COBOL.	C.P.U. TIME 11 Seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	DATA/G/584/16CALC	CALC-FILE
OUT	DISK	DATA/G/584/17SCORE	FAC-SCORE-FILE
IN	DISK	DATA/G/584/15WWTP	WWTD-MASTER-FILE
OUT	DISK	DATA/G/584/17WWTP	WWTD-SCORE-FILE
OUT	DISK	DATA/G/584/TEMP	TEMP-FILE
I/O	DISK	SORT-REC	SORT-FILE

SPECIAL INSTRUCTIONS

	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/18

G/584/18

PRINT FACILITY HAZARD PRIORITY REPORT

SDM-100

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	SDM/70 GENERAL DOCUMENTATION FORM	PROJECT NUMBER	G584
		DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/18

GENERAL INFORMATION:

This program produces the Facility Hazard Priority Report using scores as previously calculated and sort options as requested by the user. The WWTP Hazard Priority Report is also printed in the same manner.

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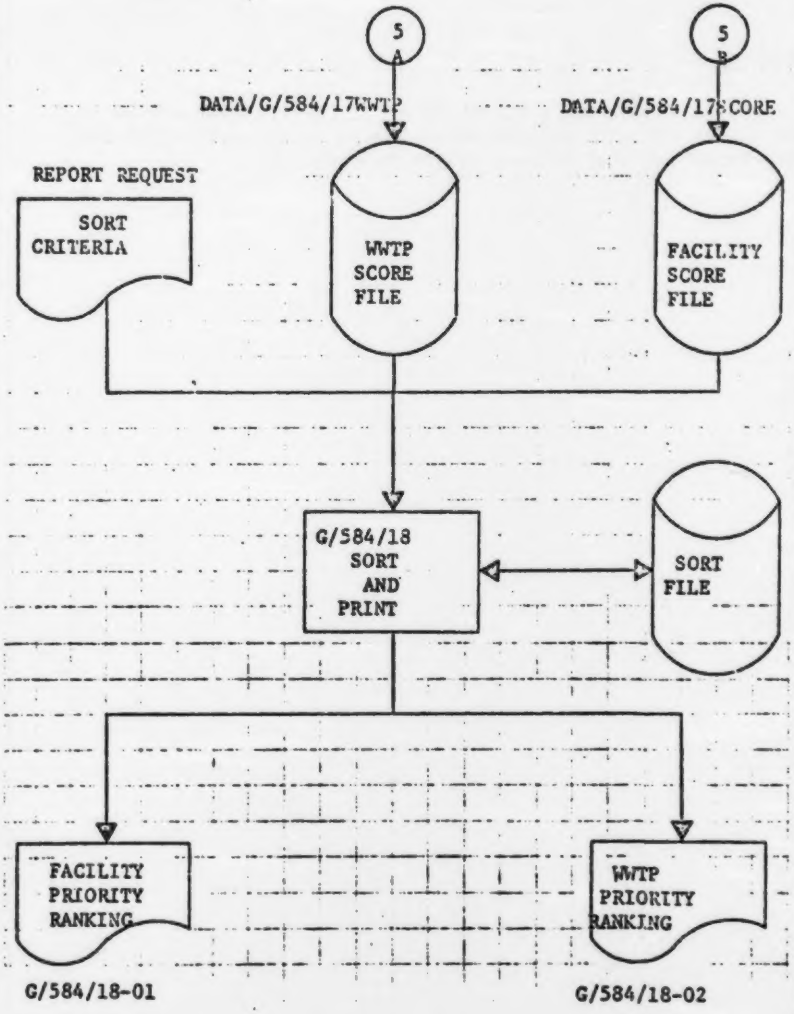
SDM/70

CHART OR TABLE FORM

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/18

NOTES


5 A
5 B
DATA/G/584/17WWTP
DATA/G/584/17SCORE
REPORT REQUEST
SORT CRITERIA
WWTP SCORE FILE
FACILITY SCORE FILE
G/584/18 SORT AND PRINT
SORT FILE
FACILITY PRIORITY RANKING
WWTP PRIORITY RANKING
G/584/18-01
G/584/18-02

SDM-101

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PROGRAM ABSTRACT

2367 (2/79)

DESCRIPTION

This program produces the Facility Hazard Priority Report using scores as previously calculated and sort options as requested by the user. The WWTP Hazard Priority Report is also printed in the same manner.

REQUESTING DIVISION Environmental Services	SECTION TSCA		UNIT
PRODUCTION CYCLE On Request	SETUP DNR Data Center	PAGES	COPIES	OVERLAY ID

FILE IDENTIFICATION	KEYWORD	BLOCK FACTOR	RECORD LENGTH	UNITS	MODE	FILE DESCRIPTION	RETENTION
DATA/G/584/17WWTP	DNRTOXIC	6	60	C		WWTP Score File	999
DATA/G/584/17SCORE	DNRTOXIC	10	100	C		Score File-Facility	999
SORT-RECORD	DNRTOXIC		100	C		Sorted File	
G/584/PRINTER	DNRTOXIC		132	C		Report File	

PROGRAM NAME Print Facility Hazard Priority Report	APP.	EFFECTIVE DATE	PROGRAM NUMBER G/584/18

[illegible]

SORT MEMORY NA	SORT DISK DISKPACK	SORT TAPES NA	COMPILER COBOL	C.P.U. TIME 6 Seconds

I/O	EQUIPMENT	FILE IDENTIFICATION	INTERNAL FILE NAME
IN	DISK	DATA/G/584/17SCORE	FAC-SCORE-FILE
I/O	DISK	SORT-RECORD	SORT-FILE
OUT	PRINTER	G/584/PRINTER	PRINT-FILE
IN	DISK	DATA/G/584/17WWTP	WWTP-SCORE-FILE

SPECIAL INSTRUCTIONS

SDM/70
GENERAL OUTPUT DESCRIPTION

PROJECT NUMBER	G584
DATE	2/1/82

SYSTEM TITLE	TSCA	PART	Priority Ranking
PHASE	Productional Design	SECTION	G/584/18

IDENTIFICATION

REPORT NO.: G/584/18-01 REPORT NAME: Facility Hazard Priority Report EXH. NO.: III-D

TYPE OF REPORT	☐ SUMMARY	☐ EXCEPTION	☒ DETAIL	☐ ERROR	☐ OTHER.
MEDIA OF OUTPUT	☒ PRINTED	☐ CRT	☐ CARD	☐ MICROFILM	☐ OTHER:
FREQUENCY	☐ DAILY	☐ WEEKLY	☐ MONTHLY	☒ ON DEMAND	☐ OTHER:

ACCESS SECURITY	None
OUTPUT CONTENT	contains facility level information and calculated scores for each preselected facility. Messages appear to alert user of possible unreliable information
INTERACTION WITH DISPLAY	None
TOTALS	None
APPROX. SIZE	8.5 x 11 inches
OUTPUT USE	aid the Office of Toxic Material Control in identifying problems involving the use and discharge of critical materials
OUTPUT USERS	Office of Toxic Material Control

SDM-400

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Q/584.   01                            MICHIGAN DEPARTMENT    NATURAL RESOURCES                                   PAG.      1
RUN DA.. - 05/12/81                      BUREAU OF ENVIRONM  .AL PROTECTION
                                         FACILITY HAZARD PRIORITY REPORT

    FACILITY                                                                 <---------------- SCORES ---------------->

     560004      DOW CHEMICAL CO                    COUNTY      : 56          USE:324.4      TOTAL DISCHARGE      :386.5**
                 SIC: 2800                          RIVER BASIN: 2104032                       SURFACE WATER :376.5
                 ZIP: 48640                         SAN.SEWER   : 0560009                      SANITARY SEWER: 10.0
                 # CRIT MAT: 53                                                                GROUND WATER  :  0.0
        *WARNING-AT LEAST ONE CRITICAL MATERIAL FOR THIS FACILITY DISCHARGES TO 5 OUTFALLS
                 ADDITIONAL GPS OUTFALL NUMBERS MAY BE FOUND ON THE ACTUAL REPORT FORM

     820311      FORD MOTOR CO                      COUNTY      : 82          USE:150.7      TOTAL DISCHARGE      :255.5
                 SIC: 3714                          RIVER BASIN: 0613110                       SURFACE WATER :142.0
                 ZIP: 48243                         SAN.SEWER   : 0820214                      SANITARY SEWER:113.5
                 # CRIT MAT: 23                                                                GROUND WATER  :  0.0
        *WARNING-AT LEAST ONE CRITICAL MATERIAL FOR THIS FACILITY DISCHARGES TO 5 OUTFALLS
                 ADDITIONAL GPS OUTFALL NUMBERS MAY BE FOUND ON THE ACTUAL REPORT FORM

       ** DISCHARGE SCORE AS PRINTED MAY BE ERRONEOUS DUE TO MISSING REQUIRED INFORMATION
```

	SDM/70 GENERAL OUTPUT DESCRIPTION	PROJECT NUMBER G584 DATE 2/1/82

SYSTEM TITLE TSCA	PART Priority Ranking
PHASE Productional Design	SECTION G/584/18

IDENTIFICATION

REPORT NO.: G/584/18-02 REPORT NAME: Wastewater Treatment Plant Hazard Priority Report EXH. NO.. III-E

TYPE OF REPORT	☐ SUMMARY	☐ EXCEPTION	☒ DETAIL	☐ ERROR	☐ OTHER:
MEDIA OF OUTPUT	☒ PRINTED	☐ CRT	☐ CARD	☐ MICROFILM	☐ OTHER:
FREQUENCY	☐ DAILY	☐ WEEKLY	☐ MONTHLY	☒ ON DEMAND	☐ OTHER:

ACCESS SECURITY	None
OUTPUT CONTENT	Contains wastewater treatment plant level information and calculated scores for preselected plants. Messages appear to alert user of possible unreliable score values.
INTERACTION WITH DISPLAY	None
TOTALS	None
APPROX. SIZE	8.5 x 11 inches
OUTPUT USE	Aid the Office of Toxic Material Control in identifying problems involving the discharge of critical materials to sanitary sewer systems.
OUTPUT USERS	Office of Toxic Material Control

SDM-400

[illegible]

```
G/584/18-02
RUN DATE 06/15/81                  MICHIGAN DEPARTMENT OF NATURAL RESOURCES
                                     BUREAU OF ENVIRONMENTAL PROTECTION                                        PAGE      1
                                        WASTEWATER TREATMENT PLANT
                                          C.M. PRIORITY RANKING

      040033      ALPENA
                  COUNTY:04-T3T3RINRS8E       %INDUSTRIAL VOL W/CM OF INFLUENT: 09.5%     PRIORITY SCORE:    18.9
                  RIVER BASIN:2110010         %EFFLUENT OF RECEIVING STREAM   : 02.2%
                                              DESIGN USE OF RECEIVING STREAM  :A1
      800059      SOUTH HAVEN
                  COUNTY:80-TT15RR17SW        %INDUSTRIAL VOL W/CM OF INFLUENT: 00.6%     PRIORITY SCORE:    15.0
                  RIVER BASIN:0831030         %EFFLUENT OF RECEIVING STREAM   :100.0%
                                              DESIGN USE OF RECEIVING STREAM  :C2
```

APPENDIX D

Laboratory Methods Development

The following was accomplished in the MDNR Environmental Laboratory with support from the Toxic Substances Control Act Cooperative Agreement grant.

1. The capability to analyze water, sediment, air, and biological samples for polynuclear aromatic hydrocarbons, purgeable aromatic hydrocarbons, and polynuclear aromatic hydrocarbons was developed (see attached methodologies).

2. The analysis for volatile organic microcontaminants was improved by an increase in the number of compounds the Laboratory was capable of analyzing, a lowering of detection limits, and the coupling of gas chromatographs with a computer data system.

3. A system for routinely scanning environmental samples for the most commonly found organic microcontaminants was developed (Table D-1).

4. Detection limits were lowered for arsenic and mercury in water, sediments, and biological tissue and improved digestion techniques are being developed for arsenic, antimony, selenium, mercury, and tin.

Scan 1 Purgeable Halocarbons

Bromoform
Bromodichloromethane
Chlorodibromomethane
Chloroform
Carbon tetrachloride
Dichloromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene (TCE)
1,1,2,2-Tetrachloroethane
Tetrachloroethene (PCE)
1-Bromo-3-chloropropane
1,2-Dichloropropane
Chlorobenzene

Scan 2 Purgeable Aromatic Hydrocarbons

Benzene
Toluene
o-Xylene
m-Xylene
p-Xylene
Ethylbenzene
Styrene

Scan 3 Chlorinated Hydrocarbons

Hexachlorobutadiene (HCBD)
Hexachlorocyclopentadiene (HCP)
Hexachlorobenzene (HCB)
Octachlorocyclopentene (OCP)
Pentachloronitrobenzene (PCNB)

Scan 4 Polychlorinated biphenyls and organochlorine pesticides

Arochlor 1016
Arochlor 1221
Arochlor 1232
Arochlor 1242
Arochlor 1248
Aroclor 1254
Aroclor 1260
Aroclor 1262
DDE
DDD
DDT
Hexabromobenzene (HBB)
Heptachlor
Heptachlor epoxide
Toxaphene
Chlordane
Lindane
Mirex
Methoxychlor
Aldrin

Scan 5 Brominated Hydrocarbons

PBB

Scan 6 Phthalate Esters and Polar Pesticides

Bis(2-ethylhexyl)phthalate
Butyl benzyl phthalate
Di-n-butyl phthalate
Diethyl phthalate
Di-n-octyl phthalate
Dieldrin
Endosulfan I
Endrin

Scan 7 Polynuclear Aromatic Hydrocarbons

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(ghi)perylene
Chrysene
Dibenzo(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenanthrene
Pyrene

Scan 8 Phenols

2,4-Dichlorophenol
2,3,5-Trichlorophenol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
Pentachlorophenol

Purgeable Halocarbons - Method 601

1. Scope and Application

1.1 The method presented here provides for the gas chromatographic determination of volatile halocarbons that are less than 2% soluble in water and boil below 150°C. The following parameters have been determined by this method:

Parameter

1-Bromo-3-chloropropane
Bromoform
Bromodichloromethane
Carbon tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroform
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethene
1,2-Dichloropropane
Methylene chloride
1,1,2,2-Tetrachloroethane
Tetrachloroethene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene

1.2 This method is applicable to the determination of these compounds in municipal and industrial discharges, finished waters, natural surface and ground waters. It is designed to be used to meet the monitoring requirements of the National Pollutant Discharge Elimination System (NPDES). As such, it presupposes a high expectation of finding the specific compounds of interest.

1.3 The sensitivity of this method is usually dependent upon the level of interferences rather than instrumental limitations. The limits of detection listed in Table 1 represent sensitivities that can be achieved in wastewaters under optimum operating conditions. In this laboratory values below 1 ug/l are not reported. The useful concentration range for quantitative analysis is approximately 1-2500 ug/l.

1.4 This method is recommended for use only by experienced residue analysts or under the close supervision of such qualified persons.

2. Summary of Method

2.1 An inert gas is bubbled through a 5 ml water sample contained in a specially-designed purging chamber. The halocarbons are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a short sorbent tube where the halocarbons are trapped. After the purge is completed, the trap is heated and backflushed with gas to desorb the halocarbons into a gas chromatographic system. A temperature program is used in the GC system to separate the halocarbons before detection with a halide-specific detector.

3. Interferences

3.1 The analytical system must be demonstrated to be free from contamination under the conditions of the analysis by running method blanks. Method blanks are run by charging the purging device with organic-free water and analyzing it in a normal manner.

3.2 Samples can be contaminated by diffusion of volatile organics (particularly freons and methylene chloride) through the septum seal into the sample during shipment and storage. A sample blank prepared from organic-free water and carried through the sampling and handling protocol can serve as a check on such contamination. Due to prevalence of methylene chloride vapors in the laboratory air, positive values for this compound are not reported out.

3.3 Cross contamination can occur whenever high level and low level samples are sequentially analyzed. To reduce the likelihood of this, the purging device and sample syringe should be rinsed out twice between samples with organic-free water. Whenever an unusually contaminated sample is encountered, it should be followed by an analysis of organic-free water to check for cross contamination. For samples containing large amounts of water-soluble materials, suspended solids, high boiling compounds or high organohalide levels, it may be necessary to wash out the purging device with dilute nitric acid, rinse with distilled water, and then dry in a 105°C oven between analyses.

3.4 Under the conditions used here, several compounds are known to coelute and therefore cannot be separately identified in the same sample. These combinations are: 1,1,2,2-tetrachloroethane and tetrachloroethene; chlorodibromomethane 1,1,2-trichloroethane and cis-1,3-dichloropropene; pentachloroethane and chlorobenzene.

4. Apparatus and Materials

4.1 Sampling equipment, for discrete sampling.

4.1.1 Bottle, with cap--250 ml capacity screw cap.

4.1.2 Septum--Teflon--faced silicone (Pierce #12722 or equivalent).

4.2 Purge and trap device--The purge and trap equipment consists of three pieces of apparatus: the purging device, trap, and desorber.

4.3 Gas chromatograph--Analytical system complete with programmable gas chromatograph suitable for on-column injection and all required accessories including halide-specific detector, column supplies, recorder, and gases. A Hewlett-Packard 3354 Lab Automation System is used for data acquisition and calculations.

4.4 Micro syringes--10, 25, 100 ul.

4.5 2-way syringe valve with Luer ends (3 each).

4.6 Syringe--5 ml gas-tight with shut-off valve.

4.7 Bottles - miscellaneous screw-cap, with Teflon cap liners.

4.8 Standard laboratory glassware.

4.9 Water purifier.

5. Reagents

5.1 Sodium thiosulfate--(ACS) Granular.

5.2 Trap Materials.

5.2.1 Porus polymer packing 60/80 mesh chromatographic grade Tenax GC (2,6-diphenylene oxide).

5.2.2 Three percent OV-1 on Chromosorb-W 60/80 mesh.

5.3 Organic-free water.

5.3.1 Organic-free water is defined as water free of interference when employed in the purge and trap procedure described herein. It is generated by passing distilled water through a Gelman Water I water purifier until resistivity is at least 10 megohm/cm.

5.4 Nano Grade Methanol.

5.5 Stock standards--prepare stock standard solutions in methyl alcohol using assayed liquids. Because of the toxicity of some of the organohalides, primary dilutions of these materials should be prepared in a hood.

5.5.1 Place about 9.8 ml of methyl alcohol into a 10 ml ground glass stoppered volumetric flask. Allow the flask to stand, unstoppered for about 10 minutes or until all alcohol wetted surfaces have dried. Weigh the flask to the nearest 0.1 mg.

5.5.2 Using a Pasteur Pipette, immediately add the assayed reference material to the flask, then reweigh. Be sure that the drops fall directly into the alcohol without contacting the neck of the flask. Add, as nearly as possible, 0.3125 g of reference material.

5.5.3 Dilute to volume, stopper, then mix by inverting the flask several times. Transfer the standard solution to a 10 ml screw-cap bottle with a Teflon cap liner.

5.5.4 Calculate the concentration in micrograms per milliliter from the net gain in weight (should be approximately 31,250 ug/ml).

5.5.5 Store stock standards in a freezer. Prepare fresh standards monthly or whenever the values consistently fall below the minimums listed in Table 2.

6. Calibration

6.1 Using stock standards prepare 3 secondary dilutions in methanol that will generate concentrations from 3 to 250 ug/l when appropriate amounts are injected into 100 ml of organic-free water. See Table 2 for compounds that are combined to make the working standards.

6.1.1 Standard #2 - Add 240 ul of each stock standard into a 25 ml volumetric flask using a microliter syringe and dilute to volume with methanol. This will give a concentration of 300 ug/ml of each component.

6.1.2 Standard #1 - Make a 1:10 dilution of standard #2.

6.1.3 Standard #3 - Pipette 1 ml of each stock standard into a 25 ml volumetric flask, and dilute to volume with methanol. This will give a concentration of 1,250 ug/ml.

6.1.4 The following calibration standards can be prepared from the working standards:

ug/l	ul injected/100 ml	Standard
3	10	1
6	20	1
15	5	2
30	10	2
60	20	2
125	10	3
250	20	3

6.2 Assemble the necessary gas chromatographic apparatus and set operating parameters indicated in section 9.1. By injecting secondary dilution standards, establish the sensitivity limit and the linear range of the analytical system for each compound.

6.3 Condition new traps overnight at 180°C by backflushing with an inert gas flow of at least 20 ml/min. Prior to use, daily condition traps 10 minutes while backflushing at 180°C. Analyze a blank and 6, 30, 125 and 250 ug/l aqueous calibration standard and construct a calibration curve of concentration vs area for each component.

7. Quality Control

7.1 Before processing any samples, the analyst should daily demonstrate through the analysis of an organic-free water method blank that the entire analytical system is interference-free. A blank spiked with the internal standard should be analyzed to verify that the system is functioning properly. Each day plot the ratio of the two internal standards to monitor instrument performance.

7.2 Field replicates should be collected to validate the precision of the sampling technique. Where doubt exists over the identification of a peak on the gas chromatogram, confirmatory techniques such as mass spectroscopy should be used.

7.3 At the start of each shift, analyze a 30 ug/l standard. If the concentration varies by more than 2 0 from the previous analysis, recalibrate the system. If the value is within 2 0, the previous calibration curve is still valid. See Table 2 for acceptable standard values.

7.4 Each day verify detection limits by analyzing a 3 ug/l standard. Adjust detection limit on any sample requiring dilution or having a baseline noise greater than 1 mm.

7.5 For each group of ten samples, randomly analyze one positive sample in duplicate, and report out both values.

7.6 Once each quarter analyze the EPA Quality Assurance Samples for purgeable halocarbons.

7.7 The analyst should maintain constant surveillance of both the performance of the analytical system and the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and blank with surrogate halocarbons. A combination of bromochloromethane and 2-bromo-1-chloropropane is used to encompass the boiling range covered by this method. If the recovery of the surrogate standard shows a deviation greater than two standard deviations (7.3.1), repeat the dosed sample analyses. If the deviation is again greater than two standard deviations, dose another aliquot of the same sample with the compounds of interest at approximately two times the measured values and analyze. Calculate the recovery for the individual compounds using these data.

7.7.1 From stock standard solutions prepared as above, add a volume to give 1000 ug of each surrogate to 45 ml of nano grade methanol contained in a 50-ml volumetric flask, mix and dilute to volume (20 ng/ul). Dose 5.0 ul of this surrogate spiking solution directly into the 5 ml syringe with every sample and reference standard analyzed. Prepare a fresh surrogate spiking solution whenever values fall below minimums in Table 2.

8. Sample Collection, Preservation, and Handling

8.1 Grab samples are collected in 250 ml glass bottles. Fill the sample bottles in such a manner that no air bubbles pass through the sample as the bottle is being filled. Seal the bottle so that no air bubbles are entrapped in it. Maintain the hermetic seal on the sample bottle until time of analysis.

8.2 The samples must be iced or refrigerated from the time of collection until extraction. If the sample contains free or combined chlorine, add sodium thiosulfate preservative (60 mg/250 ml will suffice for up to 5 ppm Cl_2) to the empty sample bottles just prior to shipping to the sampling site, fill with sample just to overflowing, seal the bottle, and shake vigorously for 1 minute.

8.3 All samples must be analyzed within 14 days of collection.

9. Sample Extraction and Gas Chromotograph

9.1 Set instrument operating conditions as follows:

9.1.1 Tekmar LSC-2
Purge: 11 min.
Desorb: 4 min.
Bake: 4 min.
Desorb preheat: 180°C
Desorb: 180°C
Trap bake: 180°C
Purge ready: 30°C
Desorb ready: 80°C
Trap: Tenax GC

9.1.2 Tracor 550 GC
Initial hold: 2 min.
Initial temperature: 80°C
Program rate: 10°/min.
Final hold: 6 min.
Final temperature: 190°C
Cool: 6 min.
Column: 6' x 2 mm Id glass
Packing: 60/80 Carbopack B with 1% SP1000
Column Flow: rotometer set at 45 40 cc/min.
Carrier: Helium
Inlet: 100°C
Outlet: 125°C

9.1.3 Hall Model 700 Detector
Temperature: 900°C
Electrolyte Flow: 1.0 ml/min 50% n-propanol
Hydrogen Flow: 30 cc/min.
Conductivity Range: 100
Attenuator: 16

9.1.4 Data System

Delay: 1 min.
Stop: 20 min.
Area Reject: 20,000
Slope Sensitivity: .30
Method: External standard
Calibration: 30 ug/l

9.2 Warm sample to room temperature by briefly immersing bottle in a water bath controlled to 30°C. Do not allow samples to remain in bath longer than 20 min.

9.3 Remove the plunger from a 5 ml syringe and attach a closed syringe valve. Open the sample bottle (or standard) and carefully pour the water into the syringe barrel until it overflows. Replace the syringe plunger and compress the sample. Open the syringe valve and vent any residual air while adjusting the sample volume to 5.0 ml. Add 5.0 ul of the surrogate spiking solution (7.3) through the valve bore, then close the valve.

9.4 Attach the syringe-syringe valve assembly to the syringe valve on the purging device. Open the syringe valves and inject the sample into the purging chamber.

9.5 Close both valves and press start button when "purge ready" light comes on.

9.6 At the end of the purge cycle, the temperature program and data system are started automatically.

9.7 After the trap has been desorbed into the gas chromatograph, empty the purging chamber using the sample introduction syringe. Wash the chamber with two 5 ml flushes of organic-free water. The Tekmar is ready for the next sample. Included in Table 1 are estimated retention times and sensitivities that can be achieved by this method.

9.8 Dilute any sample which falls outside the calibration range. Dilutions of 1:10 or less can be made by injecting the appropriate amount of sample, then injecting enough deionized water to make 5 ml. Dilutions greater than 1:10 can be made directly in the 5 ml syringe using a microliter syringe to measure sample.

10. Calculations

10.1 The concentration of individual compounds is calculated by the data system from response factors stored in the method. Round off data to the nearest ug/l or two significant figures.

10.2 Report results in micrograms per liter. When duplicate and spiked samples are samples are analyzed, all data obtained should be reported.

10.3 The limit of detection for each compound not detected is calculated using 5 times the noise level at the exact retention time of the compound. This value is compared to the response of that compound in the 3 ug/l standard.

11. Accuracy and Precision

11.1 The accuracy, or percent recovery, was calculated by comparing the mean recovery of a series of analysis of a 30 ug/l standard to the spike value. Results are listed in Table 2.

11.2 The method precision is the standard deviation of a series of analysis of a 30 ug/l standard covering a period of several weeks. The standard was prepared and analyzed the same day. Results are listed in Table 2.

12. Approvals

12.1 Lead Worker David Long

12.2 Unit Supervisor James W. Belford

12.3 Lab Director ______________________

Bibliogrpahy

Federal Register Vol. 44, No. 233 Monday December 3, 1979
Federal Register Vol. 44, No. 231 Thursday November 29, 1979
"The Determination of Volatile Organic Compounds at the ug/l Level in Water by Gas Chromatography" Bellar, T.A., and J. J. Lichtenberg, U.S. Environmetnal Protection Agency, Cincinnati, OH.

Table 1 - Organohalides Tested Using Purge and Trap Method

Compound	Retention Time (min.)	Detection Limit-Average ug/l
Methylene chloride	2.57	
1,1-Dichloroethene	4.11	0.8
Bromochloromethane I.S.	4.45	—
1,1-Dichloroethane	5.10	0.7
1,2-Dichloroethene cis & trans	5.58	0.8
Chloroform	6.13	0.4
1,2-Dichloroethane	6.66	0.7
1,1,1-Trichloroethane	7.85	0.6
Carbon tetrachloride	8.16	0.5
Bromodichloromethane	8.59	0.7
1,2-Dichloropropane	9.69	0.8
Trichloroethene	10.41	0.6
Chlorodibromomethane	10.84	1.0
1,1,2-Trichloroethane	11.00	0.5
1-Chloro-2-bromopropane I.S.	11.96	—
1, Bromo-3-chloropropane	12.97	1.0
Bromoform	13.01	1.0
1,1,2,2-Tetrachloroethane	15.05	0.7
Tetrachloroethene	15.10	0.6
Chlorobenzene	17.68	2.5

Table 2 - Acceptable Values for Daily Calibration Standards

Internal Standards	Mean ug/l	Precision-Standard Deviation	Accuracy-Percent Recovery	Acceptable Range-2 σ
Bromochloromethane	19.9	1.3	99	17.3-22.5
1-Chloro-2-bromopropane	20.3	1.6	101	17.1-23.5
Ratio	1.45	.13	-	1.2-1.7
STANDARD A				
1,1 Dichloroethane	29.1	1.3	97	26.4-31.8
1,2-Dichloroethene	28.5	1.5	95	25.5-31.5
Chloroform	30.3	1.4	101	27.5-33.1
1,2-Dichloroethane	32.3	2.5	107	27.3-37.3
1,1,1-Trichloroethane	28.0	1.5	93	25.0-31.0
Carbon Tetrachloride	28.0	2.6	93	28.4-35.2
Bomodichloromethane	31.2	2.1	104	25.8-34.4
1,2-Dichloropropane	29.9	1.8	100	26.4-33.4
Trichloroethene	30.7	2.3	102	26.1-35.3
Chlorodibromomethane	30.3	3.2	101	23.9-36.7
Bromoform	32.0	3.2	107	25.6-38.4
Tetrachloroethene	31.2	2.8	104	25.6-36.8
Chlorobenzene	30.2	2.0	101	26.2-34.2
STANDARD B				
Methylene chloride	-	-	-	-
1,1-Dichloroethene				25-35*
1,1,2-Trichloroethane	30	3.1	100	24.2-36.2
1, Bromo-3-chloropropane	30	3.5	100	23.0-37.0
1,1,2,2-Tetrachloroethane				25-35*

* Not Statistically Determined

Purgeable Aromatic Hydrocarbons - Method 602

1. Scope and Application

1.1 The method presented here provides for the gas chromatographic determination of volatile aromatic hydrocarbons that are less than 2% soluble in water and boil below 150°C. The following parameters have been determined by this method:

Parameter

Benzene
Ethyl Benzene
Styrene
Toluene
Xylene

1.2 This method is applicable to the determination of these compounds in municipal and industrial discharges, finished waters, natural surface and ground waters. It is designed to be used to meet the monitoring requirements of the National Pollutant Discharge Elimination System (NPDES). As such, it presupposes a high expectation of finding the specific compounds of interest.

1.3 The sensitivity of this method is usually dependent upon the level of interferences rather than instrumental limitations. The limits of detection listed in Table 1 represent sensitivities that can be achieved in wastewaters under optimum operating conditions. In this laboratory values below 10 ug/l are not reported. The useful concentration range for quantitative analysis is approximately 10-2500 ug/l.

1.4 This method is recommended for use only be experienced residue analysts or under the close supervision of such qualified persons.

2. Summary of Method

2.1 An inert gas is bubbled through a 5 ml water sample contained in a specially-designed purging chamber. The hydrocarbons are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a short sorbent tube where the aromatics are trapped. After the purge is completed, the trap is heated and backflushed with gas to desorb the aromatics into a gas chromatographic system. A temperature program is used in the GC system to separate the aromatics before detection with a flame ionization detector.

3. Interferences

3.1 The analytical system must be demonstrated to be free from contamination under the conditions of the analysis by running method blanks. Method blanks are run by charging the purging device with organic-free water and analyzing it in a normal manner.

3.2 Samples can be contaminated by diffusion of volatile organics (particularly Freons and methylene chloride) through the septum seal into the sample during shipment and storage. A sample blank prepared from organic-free water and carried through the sampling and handling protocol can serve as a check on such contamination.

3.3 Cross contamination can occur whenever high level and low level samples are sequentially analyzed. To reduce the likelihood of this, the purging device and sample syringe should be rinsed out twice between samples with organic-free water. Whenever an unusually concentrated sample is encountered, it should be followed by an analysis of organic-free water to check for cross contamination. For samples containing large amounts of water-soluble materials, suspended solids, high boiling compounds or high hydrocarbon levels, it may be necessary to wash out the purging device with dilute nitric acid, rinse with distilled water, and then dry in a 105°C oven between analyses.

4. Apparatus and Materials

4.1 Sampling equipment, for discrete sampling.

4.1.1 Bottle, with cap--250 ml capacity screw cap.

4.1.2 Septum--Teflon--faced silicone (Pierce #12722 or equivalent).

4.2 Purge and trap device--The purge and trap equipment consists of three pieces of apparatus: the purging device, trap, and desorber.

4.3 Gas chromatograph--Analytical system complete with programmable gas chromatograph suitable for on-column injection and all required accessories including flame ionization detector, column supplies, recorder, and gases.

4.4 A Hewlett-Packard 3354 Lab Automation System is used for data collection and calculations.

4.5 Micro syringes--10, 25, 100 ul.

4.6 2-way syringe valve with Luer ends (3 each).

4.7 Syringe--5 ml gas-tight with shut-off valve.

4.8 Vials - Miscellaneous screw-cap, with Teflon cap liners.

4.9 Water purifier.

4.10 Standard laboratory glassware.

5. Reagents

5.1 Trap Materials.

5.1.1 Porus polymer packing 60/80 mesh chromatographic grade Tenax GC (2,6-diphenylene oxide).

5.1.2 Three percent OV-1 on Chromosorb-W 60/80 mesh.

5.2 Organic-free water.

5.2.1 Organic-free water is defined as water free of interference when employed in the purge and trap procedure described herein. It is generated by passing distilled water through a Gelman Water I water purifier until resistivity is at least 10 megohm/cm.

5.3 Nano Grade Methanol.

5.4 Stock standards--prepare stock standard solutions in methyl alcohol using assayed liquids. Because of the toxicity of some of the aromatics, primary dilutions of these materials should be prepared in a hood.

5.4.1 Place about 9.8 ml of methyl alcohol into a 10 ml ground glass stoppered volumetric flask. Allow the flask to stand, unstoppered for about 10 minutes or until all alcohol wetted surfaces have dried. Weigh the flask to the nearest 0.1 mg.

5.4.2. Using a Pasteur Pipette, immediately add the assayed reference material to the flask, then reweigh. Be sure that the drops fall directly into the alcohol without contacting the neck of the flask. Add, as nearly as possible, 0.5000 g of reference material.

5.4.3 Dilute to volume, stopper, then mix by inverting the flask several times. Transfer the standard solution to a 10 ml screw-cap bottle with a Teflon cap liner.

5.4.4 Calculate the concentration in micrograms per milliliter from the net gain in weight (should be approximately 50,000 ug/ml).

5.4.5 Store stock standards in a freezer. Prepare fresh standards monthly or whenever the values fall below the minimums listed in Table 2.

6. Calibration

6.1 Using stock standards prepare 3 secondary dilutions in methanol that will generate concentratons from 25 to 1000 ug/l when appropriate amounts are injected into 100 ml of organic-free water. See Table 2 for compounds that are combined to make the working standards.

6.1.1 Standard #1 - Add 250 ul of each stock standard into a 25 ml volumetric flask and dilute to volume with methanol. This will give a concentration of 500 ug/ml of each component.

6.1.2 Standard #2 - Pipette 1 ml of each stock standard into a 25 ml volumetric flask, and dilute to volume with methanol. This will give a concentration of 2000 ug/ml.

6.1.3 Standard #3 - Pipette 1 ml of each stock standard into a 10 ml volumetric flask, and dilute to volume with methanol. This will give a concentration of 5000 ug/ml.

6.1.4 The following calibration standards can be prepared from the working standards:

ug/l	ul injected/100 ml	Standard
25	5	1
50	10	1
100	20	1
200	10	2
500	10	3

6.2 Assemble the necessary gas chromatographic apparatus and set operating parameters indicated in section 9.1. By injecting secondary dilution standards, establish the sensitivity limit and the linear range of the analytical system for each compound.

6.3 Condition new traps overnight at 180°C by backflushing with an inert gas flow of at least 20 ml/min. Prior to use, daily condition traps 10 minutes while backflushing at 180°C. Analyze a blank and 25, 100, 200 and 500 ug/l aqueous calibration standard and construct a calibration curve of concentration vs peak area for each component. Calibrate the data system with a 50 ug/l standard.

7. Quality Control

7.1 Before processing any samples, the analyst should daily demonstrate through the analysis of an organic-free water method blank that the entire analytical system is interference-free. A blank spiked with the internal standard should be analyzed to verify that the system is functioning properly. Each day plot the response of the internal standard to monitor instrument performance.

7.2 Field replicates should be collected to validate the precision of the sampling technique. Where doubt exists over the identification of a peak on the gas chromatogram, confirmatory techniques such as mass spectroscopy should be used.

7.3 At the start of each shift, analyze a 100 ug/l daily check standard. If the concentration varies by more than 2σ from the previous analysis, recalibrate the data system. If the value is within 2σ, the previous calibration curve is still valid. See Table 2 for acceptable standard values. Record values of daily check standard in log book.

7.4 Each day verify detection limits by analyzing a 25 ug/l standard. Adjust detection limit on any sample requiring dilution or having a baseline noise greater than 1 mm.

7.5 For each group of ten samples, randomly analyze one positive sample in duplicate, and report out both values.

7.6 Once each quarter analyze the EPA Quality Assurance Samples for purgeable aromatics.

7.7 The analyst should maintain constant surveillance of both the performance of the analytical system and the effectiveness of the method in dealing with each sample matrix by spiking each sample, standard and blank with the surrogate standard, a,a,a-trifluorotoluene. If the recovery of the surrogate standard shows a deviation greater than two standard deviations (7.3.1), repeat the dosed sample and analyses. If the deviation is again greater than two standard deviations, dose another aliquot of the same sample with the compounds of interest at approximately two times the measured values and analyze. Calculate the recovery for the individual compounds using these data.

7.7.1 From stock standard solutions prepared as above, add 40 ul to about 9 ml of distilled water contained in a 10-ml volumetric flask, mix and dilute to volume. Dose 5.0 ul of this surrogate spiking solution directly into the 5 ml syringe with every sample and reference standard analyzed. This will give a concentration of 200 ug/l for the surrogate standard. Prepare a fresh surrogate spiking solution each day.

8. Sample Collection, Preservation, and Handling

8.1 Grab samples are collected in 250 ml glass containers. Fill the sample bottles in such a manner that no air bubbles pass through the sample as the bottle is being filled. Seal the bottle so that no air bubbles are entrapped in it. Maintain the hermetic seal on the sample bottle until time of analysis.

8.2 The samples must be iced or refrigerated from the time of collection until extraction.

8.3 All samples must be analyzed within 14 days of collection.

9. Sample Extraction and Gas Chromotograph

9.1 Set instrument operating conditions as follows:

9.1.1 Tekmar LSC-2
Purge: 11 min.
Desorb: 4 min.
Bake: 4 min.
Desorb preheat: 180°C
Desorb: 180°C
Trap bake: 180°C
Purge ready: 30°C
Desorb ready: 50°C
Trap: Tenax GC

9.1.2 Tracor 550 GC
Initial hold: 2 min.
Initial temperature: 50°C
Program rate: 6°/min.
Final hold: 4 min.
Final temperature: 90°C
Attenuation: 10 X 16
Cool: 6 min.
Column: 6' x 2 mm Id glass
Packing: 100/120 Supelcoport with 5% SP-1200/1.75% Bentone
Column Flow: rotometer set at 45 40 cc/min.
Carrier: Nitrogen
Inlet: 100°C
Outlet: 125°C

9.1.3 Flame Ionization Detector

Temperature: 200°C
Hydrogen Flow: 30 cc/min.
Air Flow: 400 cc/min.

9.2 Warm sample to room temperature by briefly immersing bottle in a water bath controlled to 30°C. Do not allow samples to remain in bath longer than 20 min.

9.3 Remove the plunger from a 5 ml syringe and attach a closed syringe valve. Open the sample bottle (or standard) and carefully pour the water into the syringe barrel until it overflows. Replace the syringe plunger and compress the sample. Open the syringe valve and vent any residual air while adjusting the sample volume to 5.0 ml. Add 5.0 ul of the surrogate spiking solution (7.3) through the valve bore, then close the valve.

9.4 Attach the syringe-syringe valve assembly to the syringe valve on the purging device. Open the syringe valves and inject the sample into the purging chamber.

9.5 Close both valves and press start button when "purge ready" light comes on. Temperature program and data system are started automatically at beginning of decord cycle.

9.6 After the trap has been desorbed into the gas chromatograph, empty the purging chamber using the sample introduction syringe. Wash the chamber with two 5 ml flushes of organic-free water. The Tekmar is ready for the next sample. Included in Table 1 are estimated retention times and sensitivities that can be achieved by this method.

9.7 Dilute any sample which falls outside the calibration range. Dilutions of 1:10 or less can be made by injecting the appropriate amount of sample, then injecting enough deionized water to make 5 ml. Dilutions greater than 1:10 can be made directly in the sample syringe using a microliter syringe to measure sample.

10. Calculations

10.1 The laboratory data system will calculate the concentration of individual compounds directly from the response factor and peak areas. The values for the Xylene isomers are summed and reported as total Xylenes. Round off data to the nearest ug/l or two significant figures.

10.2 Report results in micrograms per liter. When duplicate and spiked samples are samples are analyzed, all data obtained should be reported.

10.3 The limit of detection for each compound not detected is calculated using 5 times the noise level at the exact retention time of the compound. This value is compared to the response of that compound in the 25 ug/l standard.

11. Accuracy and Precision

11.1 The accuracy, or percent recovery, was calculated by comparing the mean recovery of a series of analysis of a 25 ug/l standard to the spike value. Results are listed in Table 2.

11.2 The method precision is the standard deviation of a series of analysis of a 25 ug/l standard covering a period of several weeks. The standard was prepared and analyzed the same day. Results are listed in Table 2.

12. Approvals

12.1 Lead Worker David Long

12.2 Unit Supervisor James W. Bedford

12.3 Lab Director

Bibliography

Federal Register Vol. 44 No. 233 Monday, December 3, 1979.

Table 1 - Aromatics Tested Using Purge and Trap Method

Compound	Retention Time (min)	Detection Limit Average ug/l
Benzene	2.45	5
a,a,a-Trifluorotoluene I.S.	3.50	-
Toluene	4.90	8
Ethyl benzene	7.85	10
p-Xylene	8.50	10
m-Xylene	8.75	10
o-Xylene	9.50	10
Styrene	10.60	10

Table 2 - Acceptable Values for Daily Calibration Standards

Internal Standard	Mean ug/l	Precision-Standard Deviation	Accuracy-Percent Recovery	Acceptable Range ug/l
a,a,a-Trifluorotoluene	208.2	18	104	200 ± 57.1
DAILY STANDARD				
Benzene	24.57	2.9	9.8	25 ± 5.8
Toluene	25.77	2.3	103	25 ± 4.6
Ethyl benzene	25.2	2.7	100	25 ± 5.4
Xylene	77.3	6.2	103	75 ± 12.4
Styrene				25 ± 3

POLYNUCLEAR AROMATIC HYDROCARBONS - METHOD 610

1. Scope and Application

1.1 This method covers the determination of certain polynuclear aromatic hydrocarbons (PAH). The following parameters have been determined by this method:

Acenapthene
Acenapthylene
Anthracene
Benzo(a) Anthracene
Benzo(a) Pyrene
Chrysene
Fluoranthene
Fluorene
Napthalene
Phenathrene
Pyrene

1.2 This method applicable to the determination of these compounds in municipal and industrial discharges, surface and groundwaters, and finished waters. It is designed to be used to meet the monitoring requirements of the National Pollutant Discharge Elimination System (NPDES). As such, it presupposes a high expectation of finding the specific compounds of interest.

1.3 The sensitivity of this method is usually dependent upon the level of interferences rather than instrument limitations. The limits of detection listed in Table 7 for the High Performance Liquid Chromotograph (HPLC) represent sensitivities that can be achieved in wastewaters in the absence of interferences.

1.4 Extractability is also determined by the matrix from which the compound is to be extracted.

1.5 This method recommended for use only by experienced residue analysts or under the close supervision of such qualified persons.

2. Summary of Method

2.1 A 1-liter sample of water is extracted with methylene chloride using seperatory funnel techniques. The extract is dried and concentrated to a volume of 10 ml or less. Chromatographic conditions are described which allow for the accurate measurement of the compounds in the extract by High Performance Liquid Chromatography (HPLC).

2.2 If interferences are encountered, the method provides a selected general purpose clean-up procedure to aid the analyst in their elimination.

3. Sample Collection and Handling

3.1 Grab sample bottle of 1 liter or 1 quart volumn amber glass with threaded screw cap. Cap must be Teflon lined but foil may be substituted if sample is not corrosive.

3.2 Automatic or manual compositing system. Must incorporate glass sample containers for the collection of a minimum of 250 ml. Sampling containers must be kept refrigerated during sampling and at all times until extraction is performed. No Tygon or rubber tubing may be used in the system.

4. Interferences

4.1 Solvents, reagents, glassware, and other sample processing hardware may yield discrete artifacts and/or elevated baselines causing misinterpretation of chromatograms. All of these materials must be demonstrated to be free from interferences under the conditions of the analysis by running blanks. Specific selection of reagents and purification of solvents by distillation in all-glass systems may be required.

4.2 Interferences coextracted from the samples will very considerably from source to source, depending upon the diversity of the industrial complex or municipality being sampled. While a general clean-up technique is provided as part of this method, unique samples may require additional clean-up approaches to achieve required sensitivities.

4.3 The extent of interferences that may be encountered using liquid chromatographic techniques has not fully been assessed. Although the chromotographic conditions discribed allow for a unique resolution of specific PAH compounds covered by this method, other PAH compounds may interfere.

4.3.1 Certain PAH compounds are known to coelute and therefore interfere with detection, identification and quantification. Fluorene and fluoranthane, anthracene and acenapthene, and chrysene and benzo (a) anthracene come off the column in unresolved peaks.

5. Apparatus

5.1 Seperatory funnel - 2,000 ml, with Teflon stopcock.

5.2 Drying column - 20 mm ID Pyrex chromatographic column with course fit (plain column with glass wool plug may be used).

5.3 Kuderna - Danish (K-D) apparatus.

5.3.1 Concentrator tube - 10 ml graduated (Kontex K-57005-1025 or equivalent) calibration must be checked. Ground glass stopper (size 19/22 joint) is used to prevent evaporation of extracts.

5.3.2 Evaporative flask - 500 ml (Kontes K-57001-0500 or equivalent) attached to concentration tube with springs (Kontes K-662750-0012).

5.3.3 Snyder column - three ball macro (Kontes K-503000-0121 or equivalent).

5.3.4 Micro Snyder column.

5.3.5 Boiling chips - solvent extracted, approximately 10/40 mesh.

5.4 Water bath - heated, with concentric ring cover, capable of temperature control (±2°C), the bath should be used in a hood.

5.5 HPLC Apparatus.

5.5.1 Gradient pumping system, constant flow.

5.5.2 Reverse phase column 10 u C_{18}.

5.5.3 Fluorescence detector for excitation at 280 mm and emission at 389 mm. Filters used for excitation 2201, and emission of 4-76 and 3-73 used.

5.5.4 UV detector, 254 mm coupled to fluorescence detector.

5.5.5 Strip chart recorder compatable with detectors.

5.6 Chromatographic column - 250 mm long X10 mm ID with course fitted disc at bottom and Teflon stopcock.

6. Reagents

6.1 Preservatives:

6.1.1 Sodium hydroxide - (ACS) 10 N in distilled water.

6.1.2 Sulfuric acid - (ACS) Mix equal volumns of conc. H_2SO_4 with distilled water.

6.1.3 Sodium thiosulfate - (ACS) Granular.

6.2 Methylene chloride, Pentane, Cyclohexane, High Purity Water - HPLC quality, distilled in glass.

6.3 Sodium Sulfate - (ACS) Granular, anhydrous (purified by heating at 400°C for 4 hours in a shallow tray).

6.4 Stock standards will be made up in acetonitrile in concentrations shown on Table 1 and kept refrigerated in ground glass stoppered containers or glass vial with Teflon lined screw caps. Combined intermediate standard is measured out in aliquots indicated in Table I, put into 50 ml volumetric and diluted to 50 ml. Appropriate dilution of this intermediate is performed to make working standard.

	Standard Concentration in ug/ml	in ug/ml	Acceptable Limits ± ug/ml	Acceptable Limit in % (% of 5x2)
Naphthalene	5.0	0.446	0.89	18
Acenaphthylene	8.8	0.816	1.63	19
Fluorene	8.2	0.736	1.47	18
Phenanthrene	3.9	0.404	0.81	20
Anthracene	1.6	0.18	0.36	23
Pyrene	21.0	2.486	4.97	24
Benz(a) anthralene	0.65	0.103	0.21	32
Benzo(a) pyrene	1.4	0.119	0.23	17

Table III Standard Insection Extractable Limits

6.5 Acetonitrile - Spectral quality.

6.6 Silica gel - 100/120 mesh desiccant (Davison Chemical grade 923 or equivalent). Before use activate for at least 16 hours at 130°C in foil covered glass container.

7. Procedure

7.1 Extraction and Clean-up.

7.1.1 Prepare glassware with methylene chloride rinse from Teflon wash bottle.

7.1.2 Mark meniscus on the side of sample bottle for later determination of sample volumn. Put sample into 2 liter seperatory funnel. Check pH and adjust within 5-9.

7.1.3 Add 60 ml methylene chloride to sample bottle, seal and shake for 30 seconds to rinse inner walls. Transfer solvent into the seperatory funnel and extract the sample by shaking the funnel for 2 minutes with periodic venting to release vapor pressure. Allow organic layer to seperate from water phase for a minimum of 10 minutes. If the emulsion interface between layers is more than one-third the size of the solvent layer, the analyst must use mechanical techniques to complete phase seperation. The optimum technique depends upon the sample, but may include stirring, filtration through glass wool, or centrifugation.

7.1.4 Pass organic layer through drying column containing 3-4 inches of anhydrous sodium sulfate and collect in 500 ml K-D flask equipped with 10 ml concentrator tube.

7.1.5 Preform two more extractions in the same manner using 60 ml methylene chloride and combine extracts. Rinse column with 20 ml of methylene chloride.

7.1.6 Add boiling chip and prewet Snyder column with methylene chloride. Place column on K-D flask and place on hot water bath of (60-65°C) so concentrator tube is partially immersed and bottom of flask is bathed in vapor. Bring down to 1 ml, remove and allow to drain 10 minutes. Rinse flask and lower joint with 2 ml methylene chloride using disposable pipet (5 ml syringe recommended). Concentrator tube may be stoppered and refrigerated at this point if further processing will not be preformed immediately.

7.1.7 If the sample is dirty, proceed to step 7.2, if clean, continue with 7.1.8. Ground and surface waters are usually clean but wastewater samples and samples with oil layers should be routinely put through the clean-up procedure. If the sample appears cloudy or contains particulate matter after passing through the sodium sulfate column, then the clean-up procedure should be used.

7.1.8 Add 4 ml acetonitrile and a fresh boiling chip. Prewet micro-Snyder column with methylene chloride, attach to concentrator tube and concentrate to 1 ml on 100°C water bath. Rinse lower joint with 0.2 ml acetonitrile and adjust volumn to 2 ml (allow for boiling chips) and stopper sample. Refrigerate if sample isn't to be run immediately.

7.1.9 Fill sample bottle to mark with distilled water. Pour water from sample bottle into 1000 ml graduated cylendar and record sample volumn to nearest 5 ml.

7.2 Clean-up.

7.2.1 Prewet micro-Snyder column with methylene chloride and attach to concentrator tube. Add 4 ml cyclohexane and a fresh boiling chip and place on water bath (100°C) so concentrator tube is partially immersed. Concentrate to 0.5 ml in 5-10 minutes and allow to drain for 10 minutes. Use minimum of cyclohexane to rinse down lower joint and adjust volumn to 2 ml.

7.2.2 Prepare slurry of 10 g activated silica gel in methylene chloride and place this in 10 mm ID chromatography column. Gently tap the column to settle silica gel and elute the methylene chloride. Add 1-2 mm of anhydrous sodium sulfate to the top of the silica gel.

7.2.3 Prelute the column with 40 ml pentane. Discard the eluate and just prior to exposure of the sodium sulfate layer to the air, transfer 1 ml of cyclohexane sample extract onto the column.

7.2.4 Just prior to exposure of the sodium sulfate layer to the air add 25 ml pentane and continue to elute column. Discard pentane eluate.

7.2.5 Elute column with 25 ml of 40% methylene chloride/60% pentane and collect eluate in 25 ml concentrator tube. Elution of column should be at a rate of about 2 ml/min.

7.2.6 Concentrate collected fraction to 1 ml by method used in step 7.1.8.

7.3 HPLC Detection.

7.3.1 Inject 50 ul of extract onto HPLC column using solvent program of 40% acetonitrile/60% distilled water isocratic for 5 minutes. Program then increases from 40% to 100% acetonitrile between 5 to 15 minute mark into program. Flow rate of 0.5 ml/min. is maintained throughout the program. Program recycles from 100% to 40% acetronitile after 36 minutes to prepare for next injection. At least 10 minutes should be allowed before each injection for column to return to equilibrium.

7.3.2 Measure retention times and peak heights and compare them to those of standard injections. Determine the concentration of individual compounds according to the formula:

$$C_2 = \frac{(C_1)(P_2)(V_t)(d)}{(P_1)(V_s)}$$

where:

P_1 = Peak size of standard
P_2 = Peak size of sample
C_1 = Concentration of standard
C_2 = Concentration of sample
V_t = Volumn of total extract
V_s = Volumn of water extracted
d = Dilution factor

Average retention times shown in Table 1.

7.3.3 Report results in micrograms per liter without correction for recovery data. When duplicate samples are analyzed, all data obtained should be reported.

8. Quality Assurance

8.1 The U.S. EPA Environmental Monitoring and Support Laboratory in Cincinnati is in the process of conducting an interlaboratory method study to determine the accuracy and precision of this test procedure.

8.2 Blanks should be extracted every 10 to 15 samples or with each set of samples if less than 10 are done in one day's extractions or when a change of reagents is made.

8.3 Spiked blanks should be preformed at the same regularity as blank extractions to determine recovery efficiency.

8.4 A recovery study was preformed by spiking 1 ml of standard into 1 liter of distilled water. Results indicated in Table 2.

Compound	Concentration	Average % Recovery	Standard Deviation of % Recovery	Lower Limit of Extraction & Detection
Napthalene	10.0 ug/ml	76.9	8.8	1.0 mg/l
Acenapthylene	17.68 ug/ml	93.3	10.0	1.8 ug/l
Fluorene	16.34 ug/ml	88.1	7.9	1.6 ug/l
Phenanthrene	7.87 ug/ml	93.4	7.1	0.8 ug/l
Anthracene	3.2 ug/ml	100.4	7.9	0.3 ug/l
Pyrene	42.0 ug/ml	97.1	7.9	4.2 ug/l
Benzo(a) anthracene	1.3 ug/ml	81.6	6.5	0.1 ug/l
Benzo(a) pyrene	2.88 ug/ml	115.3	9.3	0.3 ug/l

Table 2

8.5 Linearity studies have been run on concentrations up to twice the amount indicated in the table above and compounds appear to be extremely linear in this range.

8.6 Instrument response and standard integrity should be checked daily with standard and blank injections. Standard response was recorded for 45 inspections made on 45 different days between 8-26-80 and 11-24-80 from 6 separate dilutions of the same combined standard. Results are recorded in Table III.

8.7 Daily quality control procedures on HPLC.

8.7.1 After HPLC has been started up, a blank run should be performed to wash the column clean of compounds that may have remained from the previous day. This run may be performed without recording and on a faster program (2 ml/min suggested). Total volumns of solvents should be the same as the regular program.

8.7.2 Working standard of concentrations indicated in Table I is injected next to verify instrument response and standard integrity. If standard injection falls outside response limits a fresh wording standard should be made up. If response still falls outside acceptable limits (i.e., response instrument related) a new standard curve should be made and response limits recalculated.

8.7.3 Blank extraction injection should then be made to identify possible interferences.

8.7.4 Standard extraction injection should be made to verify compound recovery.

8.8 Detection limit is calculated by taking five times baseline noise and determining the concentration of the compound at that peak height.

8.9 If a compound is indicated by retention time and cannot be verified by peak height ratio of UV/Fluorecence detectors due to lack of response of that compound on one detector or interferences, a standard injection of the suspected compound at the same concentration will be made with the sample. Collution of the sample peak with that of the standard compound and a peak height matching the combined peak heights (i.e., a compound at concentration 1 ug/ml produces a peak of 10 mm and the peak height of the sample was 1 mm, the combined peak height would be 20 mm provided the compound is observed in its linear range on the instrument) would be considered a verification of the compound.

9. References

9.1 Method #610 Polynuclear Aromatic Hydrocarbons, Federal Register/Vol 44 no. 233/December 3, 1979.

vls

	Concentration of Stock Standard in ug/ml	Amount Used in 25 ml Intermediate STD in ml	Concentration of Intermediate STD in ug/ml	Concentration of 1' Working Standard (1:4 dil of Intermediate) in ug/ml	Average Retention Time in MIN
Naphthalene	250	2	20	5	23.8
Acenaphthylene	400	2	32	8	24.7
Fluorene	400	2	32	8	25.7
Phenanthrene	350	1	14	3.5	26.6
Anthralene	150	1	6	1.5	27.0
Pyrene	2000	1	80	20	28.9
Benz(a) Anthralene	100	1	4	1	29.6
Benzo(a) Pyrene	100	1	4	1	33.9

TABLE I

APPENDIX E

Field Investigation Report

Michigan Department of Natural Resources
Office of Toxic Materials Control

November 8, 1980

Review of Critical Materials Use and Discharge at Total Petroleum, Inc. Alma, Michigan - Gratiot County

June 2-3, 1980

The Office of Toxic Materials Control and the Point Source Studies Section conducted an industrial and environmental survey at Total Petroleum, Inc. in Alma, Michigan. The objectives of this study were 1) to verify the Critical Materials use and discharge information contained in the annual wastewater report forms submitted by Total and 2) to assess the impact of Critical Materials discharges on the surrounding environment.

Background

Total Petroleum, Inc. is an oil refinery covering 80 acres in the City of Alma in Gratiot County. The main product of the refinery is gasoline with minor production of fuel oil, jet fuel and residual oils.

Total receives intake water from the City of Alma. Total discharges its processing cooling water through two outfalls; 1) a deep well and 2) a settling pond system with final discharge to County Drain No. 52 which flows into Horse Creek, a tributary of the Pine River.

The main deep well is located on the plant grounds and extends into the Dundee layer. The well receives process water which is caustic or high in metals, phenols, ammonia and sulfate. A standby deep well is also available. The remaining process water, cooling water and storm sewer runoff is discharged to an oil/water separator and then to a series of lagoons which include primary settling, aeration, settling and polishing prior to final discharge.

Oil sludge collected from the oil/water seperator is stored in three above-ground tanks. Usable oil is recirculated back to the plant. The sludge is hauled away by Commercial Oil Services of Oregon-Ohio, once the tanks are full. Excess oil sludge, settling pond residuals and oil contaminated dirt from pipeline leaks are disposed of on Total's property adjacent to and southeast of the facility. The land is divided for disposal. Eight acres have been allocated to receive oil sludge and lagoon bottom settlings. A 22 acre plot receives the contaminated dirt resulting from pipeline leakage. Monitoring wells have been placed on the "soil farms" originally for a hydrogeological survey being conducted by Williams & Works, Inc. of Grand Rapids, Michigan.

Total reported a combination of use and/or discharge of 13 Critical Materials in 1979 (Table 1).

Methods

The industrial wastewater survey and an on-site toxicity evaluation using a continuous flow bioassay were conducted at the facility on June 2 through 6, 1980. The environmental survey was conducted on June 2, 1980 on segments of the receiving waters up and down stream of the facility. Methods used in the industrial survey and bioassay are included in the attached respective reports.

The environmental survey consisted of water column and sediment samples collected at various points on the receiving water (Figure 1).

Results and Discussion

Critical Materials Use and Discharge

The industrial survey verified the reported discharge of cyanide, nickel and hydrogen sulfide. Total had also reported a discharge of chromium, cobalt and copper. These materials were not detected in quantifiable levels in the effluent during the survey.

Total reported zero discharge of PCB's and benzene. Results of the analysis of the effluent discharged to the deep well found detectable levels of benzene (1700 ug/l) and PCB's (1300 ug/l; A-1260). Analysis of the effluent discharged to the surface waters found detectable levels of PCB (0.87 ug/l; A-1260). (See attached Industrial Survey Report; Tables 1 and 2.)

Sludge samples were taken of the oil sludge collected from the oil/water separator. Analysis of the sludge found 610,000 mg/kg of oil and grease. This caused interference in the other analyses. Zinc was found in the sludge at 380 mg/kg; chromium at approximately 70 mg/kg, copper at 70 mg/kg, nickel at 170 mg/kg and lead at 70 mg/kg (see attached Industrial Survey Report; Tables 1 and 2).

The on-site toxicity evaluation using a flow-through bioassay did not produce 48 and 96 hr. LC50 values for *Daphnia magna* and fathead minnows respectively, due to insufficient mortality. Treated process water and cooling water were the effluents used for the bioassay. This led to a determination by the Point Source Studies staff that the effluent was not acutely toxic to the above species.

Environmental Impact

Analytical results for the samples collected during the environmental survey are presented in Tables 2 and 3.

Horse Creek water had detectable levels of PCB's (0.40 ug/l). The sample was collected just downstream of the outfall where PCB's were also detected in the effluent. The level of sulfides was also elevated downstream of the outfall. Analysis for the other Critical Materials found less than detectable levels in the water column. Analysis of the stream sediment samples found 8 of 11 materials at greater than detectable levels. The three materials not found in detectable levels were PCB's, benzene and ethylene dibromide. Heavy metals were found in highest concentrations at the station located adjacent to the land application area for sludge disposal at the Superior Street crossing and at the station directly downstream of the outfall.

According to U.S. EPA guidelines[1] sediments in County Drain No. 52 and Horse Creek were classified as "moderately" to "heavily polluted" with heavy metals contaminants. Elevated levels of chromium, 40-85 mg/kg; copper 22-55 mg/kg; nickel 35-50 mg/kg; lead 40-220 mg/kg; and zinc 110-260 mg/kg were measured for the sediments. PCB's were not detected in the sediments at these stations. The levels of these metals in the upstream sample of County Drain No. 52 and the upstream sample of Horse Creek were all in the range determined to be nonpolluted according to the U.S. EPA guidelines.

Sediment samples were not taken in the Pine River downstream of its confluence with Horse Creek due to river bottom conditions.

Sampling of the monitoring wells were discussed with Total. The wells seem to have extremely small flow rates. Time periods involved for sampling and unclear flushing procedures prior to sampling collection were some points that were discussed. The DNR will review the study that is being conducted by Williams & Works due to the inability to collect representative samples.

Recommendations

The source of PCB's in the effluent at both outfall locations should be determined and eliminated.

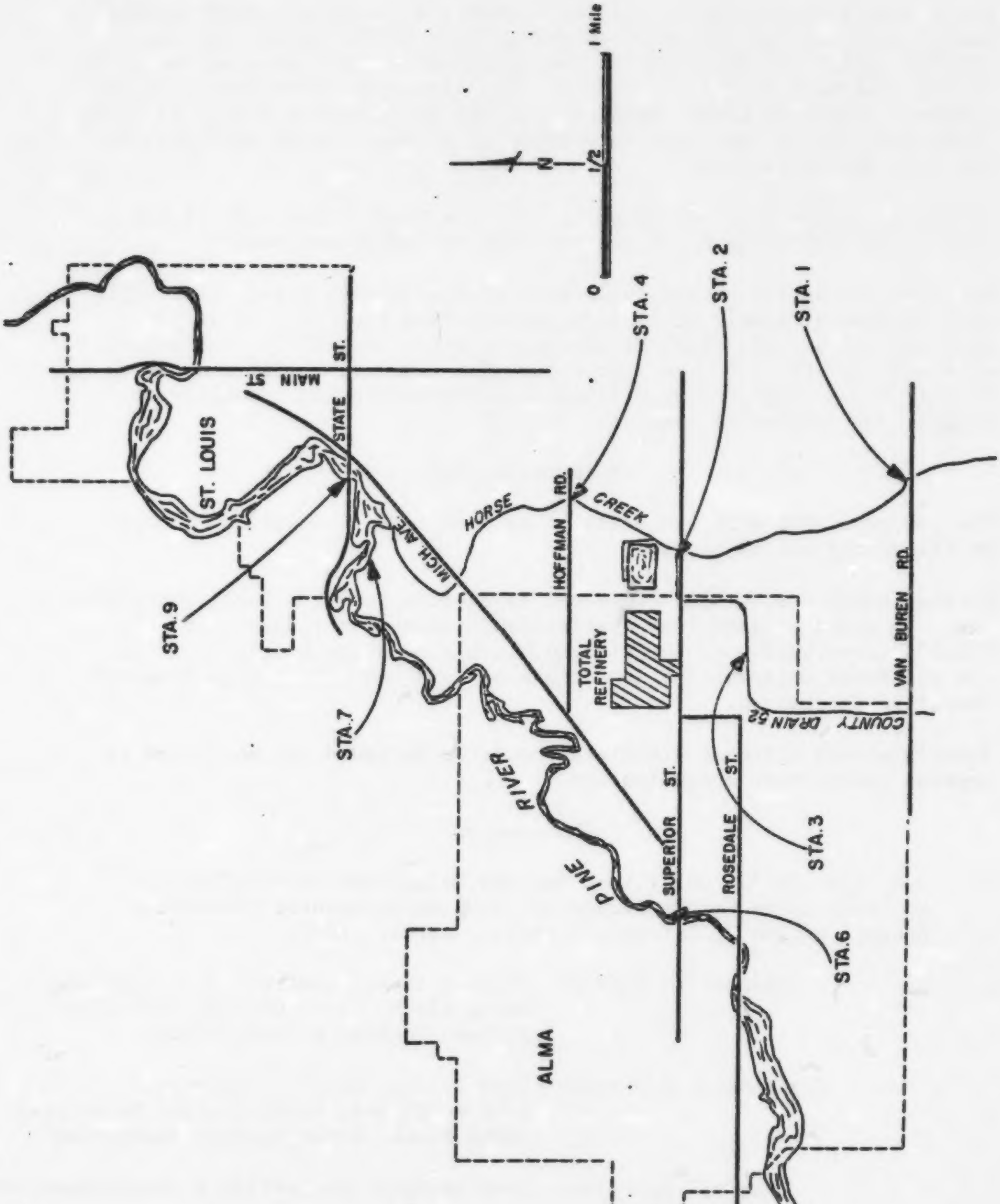
Further studies should be conducted in cooperation with Total Petroleum, Inc. on their present land application process for sludge disposal. Total's contribution to the elevated levels of heavy metals found in the sediments adjacent and downstream of land used for sludge disposal should be determined.

Total's sludge disposal practices should be reviewed and monitored to prevent groundwater contamination.

References

1. U.S. EPA, 1977. Guidelines for the Pollutional Classification of Great Lakes Harbor Sediments, U.S. Environmental Protection Agency, Region V, Chicago, Illinois, April, ,1977.

Industrial Survey:	Peter Ostlund, Environmental Engineer Maria Ficek, Water Quality Technican Jillann Koebbe, Microbiologist
Environmental Survey:	Linn Duling, Aquatic Biologist Kent Montinger, Water Quality Technician Maria Ficek, Water Quality Technician
Chemical Analysis:	Environmental Protection Bureau Laboratory
Report by:	Jillann Koebbe Office of Toxic Materials Control Environmental Services Division Michigan Department of Natural Resources



0
1/2
1 Mile
N
ST. LOUIS
MAIN ST.
STATE ST.
MICH AVE
HORSE CREEK
HOFFMAN RD.
TOTAL REFINERY
SUPERIOR ST.
ROSEDALE ST.
VAN BUREN RD.
COUNTY DRAIN 52
PINE RIVER
ALMA
STA. 1
STA. 2
STA. 3
STA. 4
STA. 6
STA. 7
STA. 9

Table 1. Comparison of reported use/discharge of Critical Materials and Industrial Survey results.

Facility: Total Petroleum, Inc.
Alma, Michigan

Outfall 001 = Stabilization Pond Effluent discharged to County Drain No. 52
Outfall 107 = Dundee Layer Deep Well

Note: Use data have been held confidential according to Act 293 and Rule 235(4). It will not be displayed in this table.

					Industrial Survey - Analytical Results		
	1978(lbs.)		1979(lbs.)		Outfall 001		Outfall 107
Critical Material	Discharged	Outfall(s)	Discharged	Outfall(s)	mg/l	Description	mg/l
Chromium	0	--	11-100	001	<0.05		<0.05
Cobalt	--	--	11-100	107	<0.05		<0.05
Copper	--	--	<1	001	<0.02		<0.02
Cyanides	1000-10,000	107	20,000	107	<0.005	total	4.5
					<0.005	free	--
Lead	0	--	0	--	<0.05		<0.05
Nickel	1000-10,000	107	1000-10,000	001, 107	0.07		0.30
Zinc	11-100	001	0	--	<0.05		<0.05
PCBs	0	--	0	--	<0.1 µg/l	A1242	<2.0 µg/l
					<0.1 µg/l	A1254	<0.2 µg/l
					0.87 µg/l	A1260	1300 µg/l
Benzene	0	--	0	--	<50 µg/l		1700 µg/l
Ethylene Dibromide	--	--	0	--	<10 µg/l		<10 µg/l
Hydrogen Sulfide	>10,000	001, 107	110,000	001, 107	0.34	sulfide	2200
Hypochlorite	6	--	0	--	740	chlorides	
Hydrazine	--	--	0		--		--

JK:vvb
11/10/80

Table 2. Environmental Survey - Water Column Analysis

Facility: Total Petroleum, Inc.
Alma, Michigan

Date: June 2, 1980

Samples collected from County Drain No. 52 and Horse Creek

Station	Chromium µg/l	Cobalt µg/l	Copper µg/l	Total-Cyanides-Free mg/l		Lead µg/l	Nickel µg/l	Zinc µg/l	PCB - µg/l 1245	1254	1260	Benzene µg/l	Ethylene Dibromide µg/l	Total Sulfides mg/l
1	<50	<50	<20	0.019	<0.019	<50	<50	<50	<0.1	<0.1	<0.1	<50	<10	<0.01
2	<50	<50	<20	0.017	<0.017	<50	<50	<50	<0.1	<0.1	<0.1	<50	<10	0.01
3	<50	<50	<20	0.021	<0.021	<50	<50	<50	<0.1	<0.1	<0.1	<50	<10	<0.01
4	<50	<50	<20	0.017	<0.017	<50	<50	<50	<0.1	<0.1	0.41	<50	<10	0.40

Samples collected from Pine River

Station	Chromium µg/l	Cobalt µg/l	Copper µg/l	Total-Cyanides-Free mg/l		Lead µg/l	Nickel µg/l	Zinc µg/l	PCB - µg/l 1245	1254	1260	Benzene µg/l	Ethylene Dibromide µg/l	Total Sulfides mg/l
6	<50	<50	<20	0.035	<0.035	<50	<50	<50	<0.1	<0.1	<0.1	<50	<10	<0.01
7	<50	<50	<20	0.016	<0.016	<50	<50	<50	<0.1	<0.1	<0.1	<50	<10	0.01
9	<50	<50	<20	0.014	<0.014	<50	<50	<50	<0.1	<0.1	<0.1	<50	<10	<0.01

Description of Sampling Station

Station	Location
1	Horse Creek at Van Buren Road
2	County Drain No. 52 at soil farm
3	County Drain No. 52 at soil farm
4	Horse Creek at Hoffman Road
6	Pine River at Superior Street
7	Pine River, upstream of Horse Creek
9	Pine River at Cheeseman Road

Table 3. Environmental Survey Stream Sediment Analysis

Facility: Total Petroleum, Inc.
Alma, Michigan

Date: June 2, 1980

Samples collected from County Drian No. 52, Horse Creek

Station	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Cyanide mg/kg	Lead mg/kg	Nickel mg/kg	Zinc mg/kg	PCB - µg/kg			Benzene	Ethylene Dibromide	Sulfides mg/kg	% Total Solids
								1245	1259	1260				
1	8	5	8	0.61	9	8	60	<300	<300	<300	U	U	110	29
2	40	10	55	0.84	220	50	260	<300	<300	<300	U	U	440	38
3	10	9	14	0.20	9	16	40	<300	<300	<300	U	U	270	63
4	85	7	22	0.48	40	35	110	<300	<300	<300	U	U	540	41
Samples collected from the Pine River														
6	15	2	7	0.29	27	4	50	<300	<300	<300	U	U	100	52
7	sediment samples not available													
9	sediment samples not available													

Description of Sampling Station

Station	Location
1	Horse Creek at Van Buren Road
2	County Drain No. 52 at soil farm
3	County Drain No. 52 at soil farm
4	Horse Creek at Hoffman Road
6	Pine River at Superior Street
7	Pine River, upstream of Horse Creek
9	Pine River at Cheeseman Road

U = undetected

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION BUREAU
POINT SOURCE STUDIES SECTION

Report of an
Industrial Wastewater Survey
Conducted at
TOTAL PETROLEUM
All Outfalls No. 290006
Gratiot County
Alma, Michigan
June 2-3, 1980

Survey Summary

Wastewater monitoring was performed during one twenty-four hour survey period starting Monday, June 2-3, 1980.

The results of the survey are compared to the final limitations in the facility's National Pollutant Discharge Elimination System (NPDES) Permit, No. MI0001066 in Table 3. Based on this comparison, the company met its daily average permit limitation for all parameters.

The results of this survey are also compared to the company's Monthly Operating Report (MOR) results for June, 1980 in Table 3. The company reported higher loadings for suspended solids, chemical oxygen demand, and ammonia nitrogen on June 3. The company's results for pH were lower on both survey dates. The company reported no discharge of sulfide during the month while the survey results showed sulfide in all samples collected.

The composite sample at outfall 290024 (001) was split with the company for comparison of laboratory analyses. The results are shown in Table 4. The company reported higher results for COD, suspended solids and ammonia nitrogen.

Results obtained in this survey are compared to the results of the previous survey conducted in November, 1978 in Table 5.

Survey Comments

This survey was conducted in conjunction with a 96-hour continuous flow acute toxicity study.

The deep well injection and sludge storage tank were sampled. The results of the analyses are shown in Table 2.

Plant Processes

Total Petroleum, Inc. employs 350 people and operates 24 hours per day, 7 days per week, 52 weeks per year. The main product of the plant is gasoline.

Fuel oil, jet fuel, and residual fuels are also produced. Alphalt production has been discontinued. Normal production is 42,000 barrels per day. During the survey the production rate was 95-100% of normal.

Most of the crude oil is transported to the plant by pipeline and the remainder by truck. The crude oil goes through desalters before being pumped to the prefractionator and the main column crude unit. This supplies the stock charge for the fluid catalytic cracker, hydrofiners, rheniformers, bender treater, and alkylation unit. Stock is also supplied to the fluid catalytic cracker by outside refiners. This results in such petroleum products as propane, regular gasoline, no lead gasoline, jet fuel, flash solvent, mineral seal, kerosene, number 1 fuel oil and number 2 fuel oil. A new Dimersol unit uses propylene to make high octane gasoline.

The vacuum distillation unit that produced asphalt is not operated.

For further details see Figure 1 which was provided by Total Petroleum. Figure 2 is a map of the plant area.

Water Supply, Wastewater & Treatment

The plant's domestic water is supplied by the City of Alma. The domestic wastewater is discharged to the Alma sanitary sewer system. Boiler feed water is softened before use.

Cooling water is recycled through three cooling towers and is supplemented by city water and water from three company wells.

The majority of the process water is used in extracting salts from the crude oil and for heating or cooling in heat exchangers. The process water that is caustic or high in metals, phenols, ammonia, and sulfates is disposed of through the main or the standby deep well. The rest of the process water, boiler blowdown, softener backwash, and the drainage from the plant goes through an oil and water separator. The oil is skimmed off and pumped back through the plant. Water from the separator is treated in a series of seven lagoons: primary settling, aeration, settling and polishing (four lagoons). The lagoon effluent, outfall 001, is discharged into County Drain 52. The retention time in the system varies from 25 to 40 days (Figure 2). There are three additional ponds used in case of an emergency spill.

Survey Procedure

The flow and samples were obtained as follows:

Outfall	Flow Measurement	Sampling
290024 (001)	Company 90° v-notch weir and survey crew installed water level recorder.	Automatic air activated composite & individual grab.
Deep Well Injection	None	Individual grab.
Oil Sludge	None	Individual grab.

A water level recorder provides a continuous account of the liquid level or head above the crest of a weir or through a flume. A head versus time graph is obtained for the duration of the survey period. The total volume of wastewater over the weir or through the flume during the survey period is computed from the graph.

An automatic sampler composites samples at timed intervals. Samples may be proportional to the instantaneous flow over the weir or through the flume.

Polychlorinated biphenyl (PCB) and sulfide composite samples are collected by the grab composite method.

An individual grab is a single instantaneous sample.

Samples were analyzed by the Environmental Protection Bureau Laboratories located in Lansing.

Samples were preserved according to Table 6. The results of the physical, chemical and bacteriological analyses are presented in Tables 1 & 2.

Total Petroleum - Alma

Table 1 Analyses of composite sample.

Outfall	290024 (001)
Survey Period From	6-2-80 - 1135
To	6-3-80 - 1135
Computed flow rate[1] (M^3/day)	1,890
Highest flow rate (M^3/day)	2,260 - 6-3-80 @ 1111
Lowest flow rate (M^3/day)	1,650 - 6-2-80 @ 2206

	mg/l	kg/day
5-day BOD	9.8	19
COD	130	250
TOC	37	70.
Suspended solids	11	21
Dissolved solids	2,324	4,390
Nitrite & nitrate nitrogen-N	0.23	0.43
Ammonia nitrogen-N	2.0	3.8
Kjeldahl nitrogen-N	4.5	8.5
Total phosphorus-P	0.27	0.51
Orthophosphates-P	< 0.01	--
Chlorides (Cl)	740	1,400
Sulfide (S)	0.34	0.64
Cyanides (CN)	< 0.005	--
Free cyanide (CN)	< 0.005	--
Phenols	0.013	0.025
Total cadmium (Cd)	< 0.02	--
Total chromium (Cr)	< 0.05	--
Total copper (Cu)	< 0.02	--
Total nickel (Ni)	0.07	0.1
Total lead (Pb)	< 0.05	--
Total zinc (Zn)	< 0.05	--
Total cobalt (Co)	< 0.05	--
	ug/l	
PCB 1242	< 0.1	--
PCB 1254	< 0.1	--
PCB 1260	0.87	1.6

1 - Flow rates used in the computation of kg/day.
To obtain MGD multiply M^3/day by 0.0002642
To obtain lbs/day multiply kg/day by 2.205

Total Petroleum - Alma

Table 2 Analyses of grab samples.

Date	Time	Flow[1] M3/day	Temp.[2] °C	pH[2] S.U.	O&G I.R. mg/l	O&G Grav. mg/l	COD mg/l	TOC mg/l	Sulfide mg/l	BOD mg/l	Chloride mg/l	Nitrite & nitrate nitrogen mg/l	Ammonia nitrogen mg/l
290024 (001)													
6-2-80	1800	1780	18	8.4	1	3	--	--	0.61	12	740	0.07	2.0
6-3-80	0815	2080	17	7.9	2	4	120	25	0.37	9.8	750	0.07	2.1
6-3-80	1135	2250	18	8.0	--	--	130	40	--	--	--	--	--
Deep Well													
6-2-80	1600	--	--	--	--	--	--	--	2,200	--	--	--	--
					mg/kg								
Sludge													
6-2-80	1600	--	--	--	610,000	--	--	--	--	--	--	--	--

Date	Time	Kjeldahl nitrogen mg/l	Total phosphorus-P mg/l	Ortho-phosphates-P mg/l	Susp. solids mg/l	Total diss. solids mg/l	Total cadmium mg/l	Total chromium mg/l	Total copper mg/l	Total nickel mg/l	Total lead mg/l
290024 (001)											
6-2-80	1800	3.7	0.26	< 0.01	--	--	< 0.02	< 0.05	< 0.02	0.07	< 0.05
6-3-80	0815	3.7	0.24	< 0.01	10	2348	< 0.02	< 0.05	< 0.02	0.07	< 0.05
6-3-80	1135	--	--	--	14	2368	--	--	--	--	--
Deep Well											
6-2-80	1600	--	--	--	--	--	< 0.02	< 0.05	< 0.02	0.30	< 0.05
								mg/kg	mg/kg	mg/kg	mg/kg
Sludge											
6-2-80	1600	--	--	--	--	--	--	J 70	70	170	70

1 - Flow at time of grab sampling.
2 - Values determined in the field at time of sampling.
J - Estimated value, value may not be accurate.

Total Petroleum - Alma

Table 2 (continued)

Date	Time	Total zinc mg/l	Total cobalt mg/l	Total cyanide mg/l	Free cyanide mg/l	Phenol mg/l	Benzene ug/l	Ethylene Dibromide ug/l	Napthalene ug/l	Dichloro-propane ug/l	Toluene ug/l
290024 (001)											
6-2-80	1800	< 0.05	< 0.05	< 0.005	< 0.005	--	< 50	< 10	< 1	< 200	--
6-3-80	0815	< 0.05	< 0.05	< 0.005	< 0.005	0.028	< 50	< 10	< 1	< 200	--
6-3-80	1135	--	--	--	--	0.023	--	--	--	--	--
Deep Well											
6-2-80	1600	< 0.05	< 0.05	4.5		--	1700	< 10	--	--	2600
		mg/kg	mg/kg				mg/kg	mg/kg			
Sludge											
6-2-80	1600	380	< 10	--	--	--	U	U	--	--	--

		PCB 1242 ug/l	PCB 1254 ug/l	PCB 1260 ug/l
Deep Well				
6-2-80	1600	< 2	< 0.2	1,300
		ug/kg	ug/kg	ug/kg
Sludge				
6-2-80	1600	< 10,000	< 10,000	< 10,000

Total Petroleum - Alma

Table 2 (continued)

Date	Time	Total zinc mg/l	Total cobalt mg/l	Total cyanide mg/l	Free cyanide mg/l	Phenol mg/l	Benzene ug/l	Ethylene Dibromide ug/l	Napthalene ug/l	Dichloro-propane ug/l	Toluene ug/l
290024 (001)											
6-2-80	1800	< 0.05	< 0.05	< 0.005	< 0.005	--	< 50	< 10	< 1	< 200	--
6-3-80	0815	< 0.05	< 0.05	< 0.005	< 0.005	0.028	< 50	< 10	< 1	< 200	--
6-3-80	1135	--	--	--	--	0.023	--	--	--	--	--
Deep Well											
6-2-80	1600	< 0.05	< 0.05	4.5		--	1700	< 10	--	--	2600
		mg/kg	mg/kg				mg/kg	mg/kg			
Sludge											
6-2-80	1600	380	< 10	--	--	--	U	U	--	--	--

Date	Time	PCB 1242 ug/l	PCB 1254 ug/l	PCB 1260 ug/l
Deep Well				
6-2-80	1600	< 2	< 0.2	1,300
		ug/kg	ug/kg	ug/kg
Sludge				
6-2-80	1600	< 10,000	< 10,000	< 10,000

Total Petroleum - Alma

Table 3 Comparison of survey results with the facility's NPDES Permit and Monthly Operating Report.

Parameter (Unit)	NPDES Permit Final Limitations		June Monthly Operating Report				Survey Results[1]
	Daily Average	Daily Maximum	Monthly Average	Monthly Maximum	6-2-80	6-3-80	
290024 (001)							
Flow (M^3/day)	--	--	1,690	2,040	1,830	2,040	1,890
Susp. solids (kg/day)	79	134	36	61	--	61	21
Oil & Grease (mg/l)	--	10	3	5	3	2	(3, 4)
Phenol (kg/day)	0.8	1.6	0.035	0.063	--	0.039	0.025
Sulfide (kg/day)	0.6	1.5	0	0	--	--	0.64
Temperature (°C)	--	--	21	26	--	--	(18, 17, 18)
COD (kg/day)	847	1630	324	522	--	441	250
pH (S.U.)	not <6.5 nor >9.5		min. 6.3	8.3	7.7	7.4	(8.4, 7.9, 8.0)
Ammonia nitrogen-N (kg/day)	66	145	3	7.3	--	7.3	3.8
BOD_5 (kg/day)	72	163	20	27	--	24	19
May 1 through October 31							
TOD[2] (kg/day)	284	--	42	69.9	--	68	45
(lb/day/cfs)	--	12.6	0.75	1.82	--	--	--

1 - Survey results are for the composite sample. Grab sample ranges are shown in parentheses ( ).

2 - TOD = 1.46 BOD_5 x 4.57 NH_3-N
To obtain MGD multiply M^3/day by 0.0002642
To obtain lbs/day multiply kg/day by 2.205

Table 4 Comparison of the laboratory analytical results obtained by Total Petroleum and the Environmental Protection Bureau from the split composite samples.

Outfall	290024 (001)	
	Total Petroleum mg/l	E.P.B. mg/l
5-day BOD	12	9.8
COD	175	130
Suspended solids	30	11
Ammonia nitrogen-N	3.5	2.0
Phenols	0.019	0.013

Table 5 Comparison of the previous survey results with the results obtained in this survey at Total Petroleum, Alma.

Outfall	290024 (001)	
Survey Date From	11-13-78	6-2-80
To	11-14-78	6-3-80
Flow Rate (M^3/day)	2,670	1,890
	mg/l	mg/l
5-day BOD	13	9.8
COD	93	130
Suspended solids	9	11
Dissolved solids	1,500	2,324
Nitrite & nitrate nitrogen-N	0.10	0.23
Ammonia nitrogen-N	2.5	2.0
Organic nitrogen-N	2.3	2.5
Total phosphorus-P	0.22	0.27
Chlorides (Cl)	540	740
Sulfide (S)	< 0.05	0.34
Cyanides (CN)	< 0.01	< 0.005
Phenols	0.020	0.013
Total zinc (Zn)	0.02	< 0.05

Table 6 Sample Preservation

Parameter	Preservative
COD & TOC	10 drops conc. H_2SO_4/250 ml (to pH <2).
Cyanide & Phenolics	Dechlorinate with ascorbic acid (if needed). 10 drops 10 N NaOH (to pH 12)/250 ml.
Total Metals	2 ml 1:1 HNO_3/250 ml (to pH <2).
Oil & Grease	10 drops conc. H_2SO_4/250 ml (to pH <2).

All samples cooled to 4°C and preserved upon collection and chain of custody maintained.

Survey by:	Peter Ostlund, General Engineer Maria Ficek, Water Quality Technician Kent Mottinger, Water Quality Technician
Contact with Management:	Patrick Lincoln
Certified Operator:	Bernie Shaver
Hydrocarbon Analyses by:	Environmental Protection Bureau Laboratory
Physical, Chemical & Bacteriological Analyses by:	Environmental Protection Bureau Laboratory
Report by:	Peter Ostlund Maria Ficek Point Source Studies Section Environmental Services Division Environmental Protection Bureau Michigan Dept. of Natural Resources

Distribution "A"
MM

Figure 1 Total Leonard, Inc.
Alma, Michigan

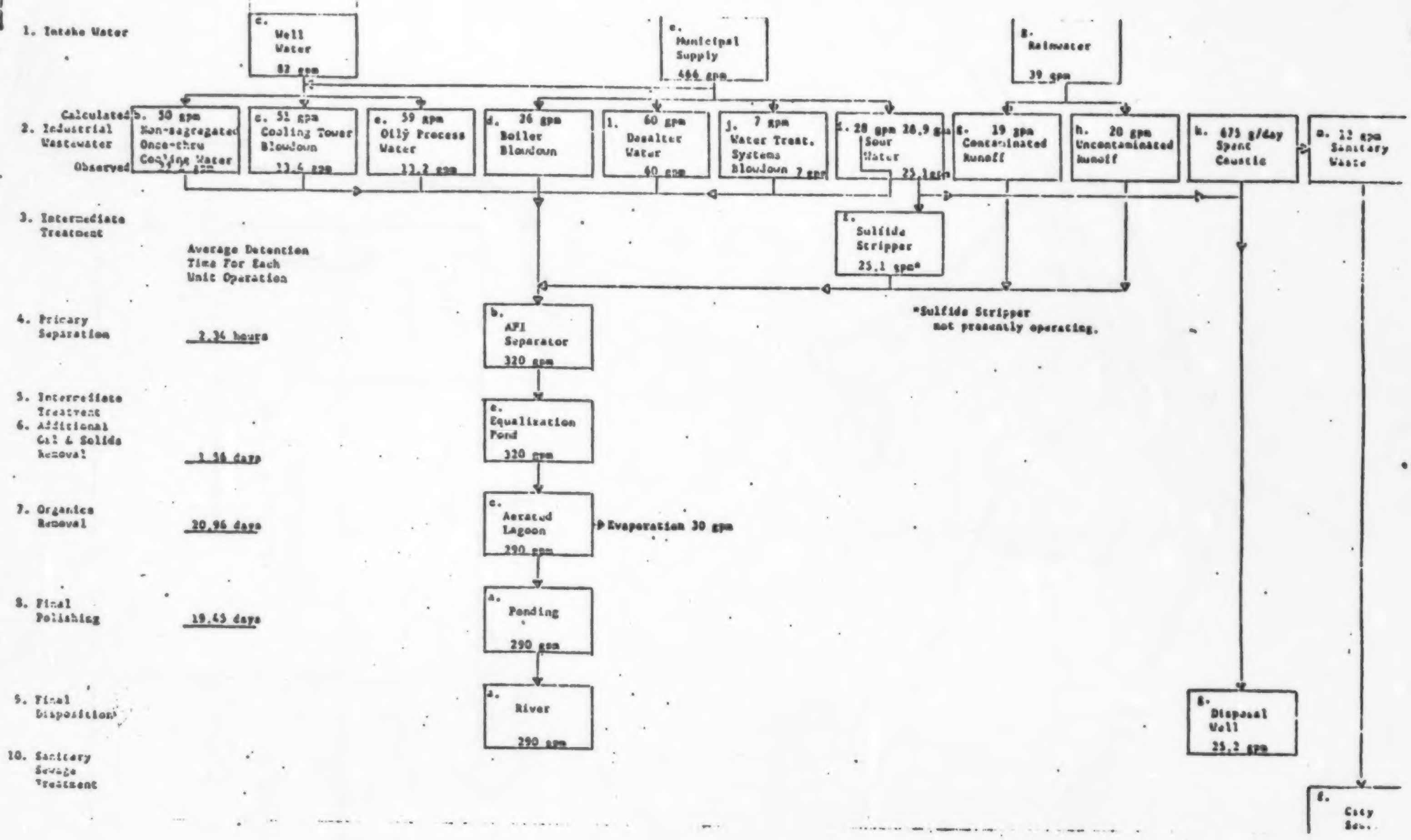
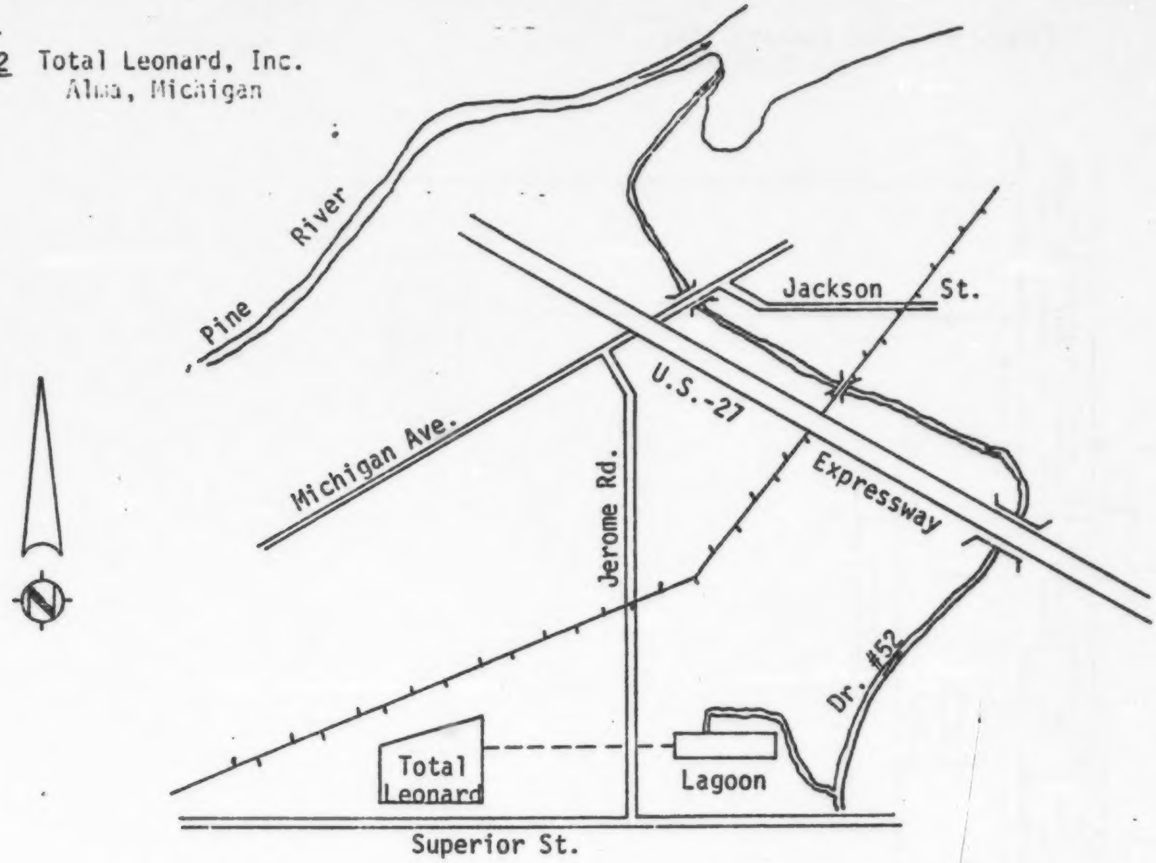
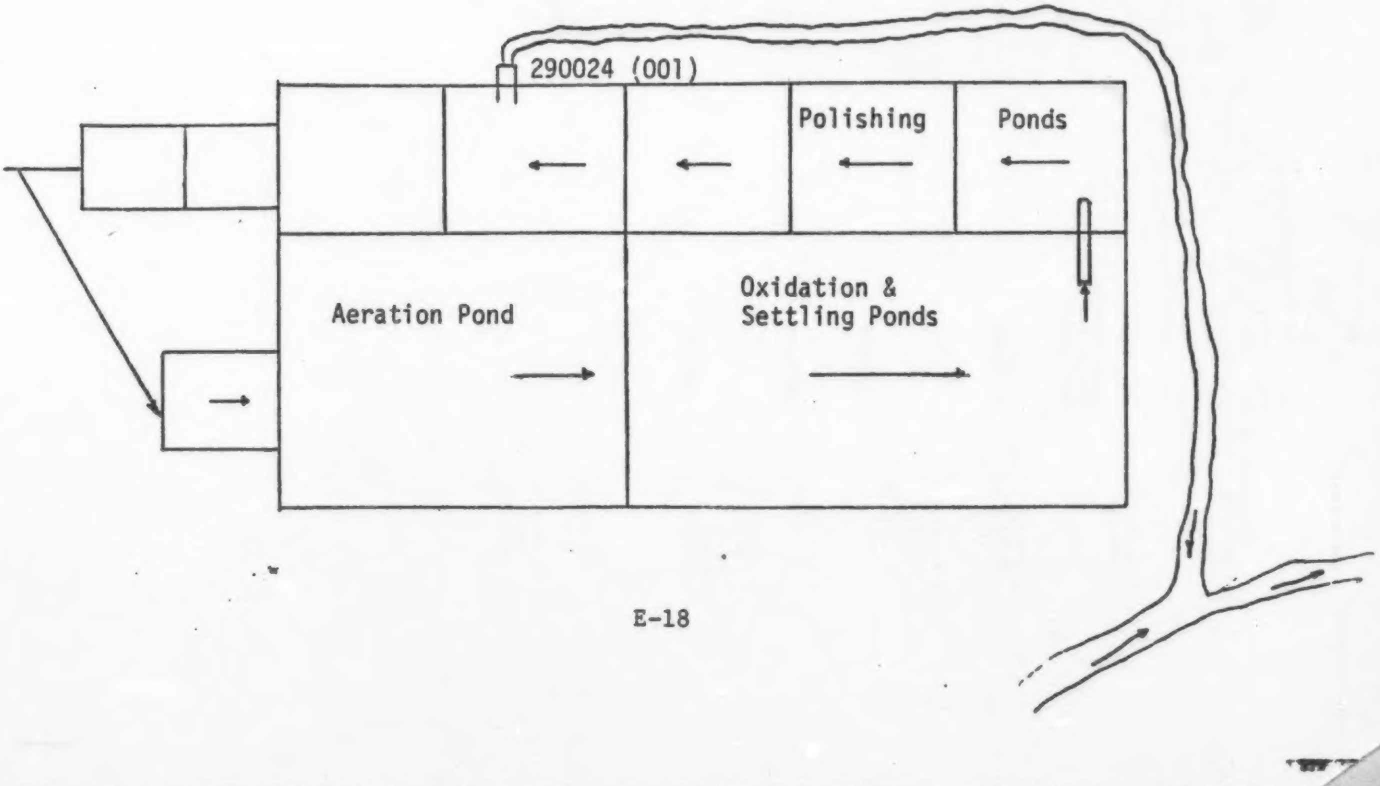

1. Intake Water
2. Industrial Wastewater
Calculated
Observed
3. Intermediate Treatment
Average Detention Time For Each Unit Operation
4. Primary Separation
2.34 hours
5. Intermediate Treatment
6. Additional Oil & Solids Removal
1.34 days
7. Organics Removal
20.96 days
8. Final Polishing
19.45 days
9. Final Disposition
10. Sanitary Sewage Treatment
c. Well Water 82 gpm
e. Municipal Supply 466 gpm
g. Rainwater 39 gpm
b. 50 gpm Non-segregated Once-thru Cooling Water
c. 51 gpm Cooling Tower Blowdown 13.4 gpm
e. 59 gpm Oily Process Water 13.2 gpm
d. 26 gpm Boiler Blowdown
i. 60 gpm Desalter Water 60 gpm
j. 7 gpm Water Treat. Systems Blowdown 7 gpm
f. 28 gpm 28.9 gpm Sour Water 25.1 gpm
f. 19 gpm Contaminated Runoff
h. 20 gpm Uncontaminated Runoff
k. 675 g/day Spent Caustic
m. 12 gpm Sanitary Waste
f. Sulfide Stripper 25.1 gpm*
*Sulfide Stripper not presently operating.
b. API Separator 320 gpm
e. Equalization Pond 320 gpm
c. Aerated Lagoon 290 gpm
Evaporation 30 gpm
a. Ponding 290 gpm
a. River 290 gpm
g. Disposal Well 25.2 gpm
f. City Sew

Figure 2 Total Leonard, Inc.
Alma, Michigan


Pine River
Jackson St.
U.S.-27 Expressway
Michigan Ave.
Jerome Rd.
Dr. #52
Total Leonard
Lagoon
Superior St.
N


290024 (001)
Polishing Ponds
Aeration Pond
Oxidation & Settling Ponds

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION BUREAU
POINT SOURCE STUDIES SECTION

Report of Two On-Site Toxicity Evaluations Conducted at
TOTAL PETROLEUM, INC.
All Outfalls No. 290006
Gratiot County
Alma, Michigan
June 2-6, 1980

Summary

During June 2-6, 1980 two on-site toxicity evaluations were conducted with treated process and cooling water effluent discharged by Total Petroleum, Inc. in Alma. The effluent is discharged via outfall 290024 (001) to County Drain 52 and subsequently to the Pine River. A 96-hour continuous flow toxicity test, using fathead minnows (Pimephales promelas) as the test species, and a 48-hour static test, using Daphnia magna as the test species, were conducted concurrently. Toxicity data were analyzed to determine the percent effluent concentration lethal to 50 percent of the test organisms (LC50).

The effluent was not acutely toxic to fathead minnows or Daphnia magna. The 96-hour LC50 for fathead minnows could not be determined due to lack of mortality. The 48-hour LC50 for D. magna could not be determined due to insufficient mortality. One daphnia died in the 100 percent concentration.

The company met final limitations in its National Pollutant Discharge Elimination System (NPDES) permit during the sampling periods indicated (Table 3).

Comments

A 24-hour industrial wastewater survey was conducted in conjunction with the toxicity tests. (Ostlund, P. and M. Ficek 1980). Partial survey results are included in this report.

Plant Processes

Total Petroleum, Inc. employs 350 people and operates 24 hours a day, 7 days a week, 52 weeks per year. The main product is gasoline, however fuel oil, jet fuel and residual fuels are also produced. Normal daily production is 42,000 barrels. During the test, production was 95 to 100% of normal. Most of the crude oil is transported to the plant by pipeline and the remainder by truck. The crude oil goes through desalters before being pumped to the pre-fractionator and the main column crude unit which supplies stock charges for the fluid catalytic cracker, hydrofiners, rheniformers, bender treater and alkylation unit. Stock is also supplied to the fluid catalytic cracker by outside refiners. Final products include propane, regular gasoline, no lead gasoline, jet fuel, flash solvent, mineral seal, kerosene, number 1 fuel oil and number 2 fuel oil. A new Dimersol unit uses propylene to make high octane gasoline.

Water Supply, Wastewater Treatment

The plant's domestic water is supplied by the City of Alma. Treatment by the city includes softening with lime and soda-ash, primary settling, sand filtration and addition of chlorine. Boiler feed water is again softened by the company. Cooling water is recycled through three cooling towers and is supplemented with city water and water from three company wells.

The majority of the process water is used in extracting salts from the crude oil and in the heat exchangers. Process water that is caustic or contains high levels of metals, phenols, ammonia, or sulfides is disposed of through the main or the standby deep well. Boiler blowdown, softener backwash, plant drainage and the remaining process water goes through an oil and water (API) separator. The oil is skimmed off and reclaimed. Solids are scraped from the bottom and hauled away. Separator water is then treated in a series of seven lagoons (Figure 1). Disodium phosphate is added to the separator water to enhance biological degradation in the lagoons. The lagoon effluent is discharged via outfall 290024 (001) to County Drain 52 and the Pine River. The retention time in the system varies from 25 to 40 days. There are three stand-by ponds in case of an emergency spill.

Methods & Procedures

An Environmental Protection Bureau mobile toxicity evaluation unit was brought on-site to conduct the continuous flow and static tests. Treated wastewater from below the outfall 290024 (001) weir and dechlorinated Alma city water were combined in the unit to create continuously flowing test solutions of various concentrations. The city water was dechlorinated with sulfur dioxide gas (SO_2). Before entering the unit the effluent and diluent passed through a heat exchanger. A Wuerthele-Riley proportional diluter delivered nominal effluent concentrations of 100, 88, 75, 66, 50, 33, 25, 12 and 0 percent to five liter test chambers. Each chamber contained 5 liters of test solution. Duplicate chambers were provided at each concentration. Ninety-nine percent volume replacement was completed approximately every two hours. Ten fish were randomly assigned to each chamber to begin the test. Test organisms, having a mean length of 4.3 cm. and a mean weight of 0.7 grams, were obtained from a private pond in Jackson County. The fish were given prophylactic disease treatments of formalin and neomycin sulfate upon aquisition and maintained at the Point Source Studies Section laboratory until use. The fish were acclimated in dechlorinated Alma city water for approximately 72 hours prior to testing. The test organisms were not fed during acclimation or testing. The 96-hour test results are presented in Table 1.

A 48-hour static test, using the cladoceran macroinvertebrate Daphnia magna as the test species, was conducted in conjunction with the flow-through test. Test concentrations corresponded to those used in the flow-through test. Duplicate test chambers (250 ml glass beakers) were provided at each concentration. Each beaker contained 200 ml of test solution. To begin the test five immature daphnids were randomly assigned to each beaker. The 48-hour test results and water chemistry data are presented in Tables 2 and 3 respectively.

Composite and grab samples of effluent and dilution water were collected during the test for selected quantitative analysis. Continuous composite samples were collected with an air probe. All samples were preserved as indicated in Table 12 and transported to the Environmental Protection Bureau Laboratory in Lansing. Laboratory results for effluent composite and grab samples and diluent grab samples are presented in Tables 4, 5 and 6.

Grab samples of the effluent and diluent were analyzed in the unit at various intervals throughout the test for the following parameters: dissolved oxygen, pH, temperature, conductivity, total hardness, total alkalinity, and total residual chlorine (Tables 7, 8 and 9). Metering instruments and recorders provided continuous records of effluent pH and conductivity. Effluent and diluent temperature were also recorded continuously.

Results of on-site analyses of test container grab samples are presented in Table 10.

During the test period mean daily flow from outfall 290024 (001) was 1830 M^3/day. Flow data were obtained from the company's June Monthly Operating Report. Two independent 24-hour flow measurements were obtained by EPB personnel.

Results & Discussion

Effluent from outfall 290024 (001) was not acutely toxic to fathead minnows. The 96-hour LC50 could not be determined due to lack of mortality.

The effluent was also not toxic to Daphnia magna. The 48-hour LC50 could not be calculated due to lack of sufficient mortality. One animal died in the 100 percent concentration. However mortality at such a low level may not be attributable to effluent toxicity. Ten percent mortality is allowable even in control concentrations in this type of testing.

EPA laboratory and field results are compared to the Total Petroleum, Inc. National Pollution Discharge Elimination System Permit No. MI0001066. Based on that comparison, the company met the final discharge limitations during the study period (Table 11).

Total phenol concentrations ranging from 0.013-0.028 mg/l were present in the samples of the treated effluent. A level of 0.001 mg/l is recommended in Quality Criteria for Water (USEPA, 1976) to protect against fish-flesh tainting. After mixing with receiving waters the concentration of phenol should not exceed 0.001 mg/l if aquatic life is to be protected.

Table 1 Percent mortality of fathead minnows after exposure to treated effluent from outfall 290024 (001).

Percent Effluent	Percent Mortality
100	0
88	0
75	0
66	0
50	0
33	0
25	0
12	0
0 (control)	0

Table 2 Percent mortality of Daphnia magna after 48 hours exposure to effluent from outfall 290024 (001).

Percent Effluent	Percent Mortality 48-hours
100	10
88	0
75	0
66	0
50	0
33	0
25	0
12	0
0 (control)	0

Table 3 Analyses run on control and effluent test solutions at the beginning and end of the 48-hour exposure period.

Parameter	Outfall 290024 (001)					
	6-3-80			6-5-80		
	Control	25%	100%	Control	25%	100%
Dissolved oxygen (mg/l)	9.1	9.1	9.6	8.3	8.6	8.7
Oxygen saturation (%)	97	97	104	90	93	95
pH (S.U.)	8.8	8.4	8.0	8.5	8.0	8.0
Temperature (°C)	18	18	19	19	19	19
Conductivity (umhos)	315	1030	3110	326	1030	3060
Alkalinity (mg/l)	--	--	--	20	--	96
Hardness (mg/l)	--	--	--	68	--	872

Table 4 Quantitative analyses of effluent composite samples at outfall 290024 (001).

Sample No.	A	B
Date	6/2-3/80	6/4-5/80
Time	1135-1135	1330-1330
5-day BOD	9.8	10
COD	130	130
Suspended solids	11	17
Total diss. solids-180°	2,324	2,236
Soluble orthophosphate-P	< 0.01	--
Total phosphorus-P	0.27	0.24
T.O.C.	37	33
Nitrite-nitrate nitrogen-N	0.23	0.066
Ammonia nitrogen-N	2.0	1.69
Organic nitrogen-N	--	2.7
Total chlorides (Cl)	740	760
Total sulfates (SO_4)	--	350
Phenols	0.013	0.023
Total sulfides (S)	0.34	0.61
Free cyanide (CN)	< 0.005	< 0.005
Total cyanide (CN)	< 0.005	< 0.005
Total cadmium (Cd)	< 0.02	< 0.02
Total chromium (Cr)	< 0.05	< 0.05
Total copper (Cu)	< 0.02	< 0.02
Total nickel (Ni)	0.07	0.07
Total lead (Pb)	< 0.05	< 0.05
Total zinc (Zn)	< 0.05	< 0.05
Total cobalt (Co)	< 0.05	< 0.05
PCB 1242	< 0.0001	< 0.0001
PCB 1254	< 0.0001	< 0.0001
PCB 1260	0.00087	< 0.0001

Note: All values in mg/l.

Table 5 Quantitative analyses of effluent grab samples at outfall 290024 (001).

Sample No.	1	2	3	4
Date	6/2/80	6/3/80	6/3/80	
Time	1800	0815	1135	
5-day BOD	12	9.8		
COD		120	130	
T.O.C.		25	40	
Suspended solids		10	14	
Total diss. solids-180°		2,348	2,368	
Soluble orthophosphate-P	< 0.01	< 0.01		
Total phosphorus-P	0.26	0.24		
Nitrite-nitrate nitrogen-N	0.07	0.07		
Ammonia nitrogen-N	2.0	2.1		
Total chlorides (Cl)	740	750		
Phenols		0.028	0.023	
Total sulfides (S)	0.61	0.37		
Free cyanide (CN)	< 0.0005	< 0.0005		
Total cyanide (CN)	< 0.0005	< 0.0005		
Total cadmium (Cd)	< 0.02	< 0.02		
Total chromium (Cr)	< 0.05	< 0.05		
Total copper (Cu)	< 0.02	< 0.02		
Total nickel (Ni)	0.07	0.07		
Total lead (Pb)	< 0.05	< 0.05		
Total zinc (Zn)	< 0.05	< 0.05		
Total cobalt (Co)	< 0.05	< 0.05		
Oil & Grease (Gravametric)	3	4		5
Oil & Grease (Infra-red)	1	2		
Benzene	< 0.05	< 0.05		< 0.05
Ethylene Dibromide	< 0.01	< 0.01		< 0.001
Napthalene	< 0.001	< 0.001		
Dichloropropane	< 0.2	< 0.2		

Note: All values in mg/l.

Table 6 Quantitative analyses of city water grab samples (dechlorinated).

Sample No.	1	2
Date	6/3/80	6/5/80
Time	0930	0822
5-day BOD	1.3	3.5
COD	19	14
Suspended solids	11	< 1
Total dissolved solids-180°	192	196
Total phosphorus-P	0.26	0.25
Nitrate-nitrite nitrogen-N	1.2	0.80
Ammonia nitrogen-N	0.02	0.047
Total chlorides (Cl)	37	36
Total sulfides (SO_2)	< 0.01	< 0.01
Total sulfates (SO_4)	68	73
Phenols	< 0.005	< 0.005
Total nickel (Ni)	< 0.05	< 0.05
Total zinc (Zn)	< 0.05	< 0.05
Total copper (Cu)	< 0.02	< 0.02
Total chromium (Cr)	< 0.05	< 0.05
Total lead (Pb)	< 0.05	< 0.05
Total cadmium (Cd)	< 0.02	< 0.02
Total cobalt (Co)	< 0.05	< 0.05
Total cyanide (CN)	< 0.005	< 0.005
Free cyanide (CN)	< 0.005	< 0.005

Note: All values in mg/l

Table 7 On-site physical and chemical analyses of effluent grab samples from outfall 290024 (001).

Date	Time	Lab. No.	Temp. (°C)	D.O. (mg/1)	pH (S.U.)	Conductivity (umho)	Total Chlorine (mg/1)	Total Alkalinity (mg/1)	Total Hardness (mg/1)
6-2-80	1320	E-1	18.5	8.7	7.8	3060	U	--	--
	1540	E-2	19.0	9.9	8.0	3040	--	100	864
	1945	E-3	19.0	10.2	8.2	2990	--	--	--
6-3-80	0800	E-4	17.0	9.3	7.9	3050	U	--	--
	1030	E-5	19.0	10.0	8.0	3070	--	--	--
	1322	E-6	19.0	11.2	8.2	3160	--	100	856
	1540	E-7	20.5	11.8	8.3	3070	--	--	--
	1946	E-8	19.0	11.6	8.4	3010	--	--	--
6-4-80	0748	E-9	17.0	8.3	8.1	3110	--	--	--
	1050	E-10	19.0	8.3	8.2	3120	--	100	880
	1350	E-11	21.5	9.6	8.3	3020	--	--	--
	1535	E-12	20.0	10.2	8.3	2980	--	--	--
	2220	E-13	19.0	9.8	8.5	3060	--	--	--
6-5-80	0750	E-14	17.5	8.3	8.0	3130	--	--	--
	1045	E-15	19.5	8.7	8.1	3130	--	--	--
	1304	E-16	20.0	9.9	8.3	3110	--	100	896
	2302	E-17	18.0	8.3	8.3	3090	--	--	--
6-6-80	0840	E-18	18.5	7.8	7.7	3110	U	100	920
	1040	E-19	19.0	8.2	7.8	3130	--	--	--

Table 8 On-site physical and chemical analysis of diluent grab samples (dechlorinated).

Date	Time	Lab. No.	Temp. (°C)	D.O. (mg/l)	pH (S.U.)	Conductivity (umhos)	Total Chlorine (mg/l)	Total Alkalinity (mg/l)	Total Hardness (mg/l)
6-2-80	1320	D-1	17.0	8.3	--	331	U	--	--
	1625	D-2	19.5	7.8	8.8	333	U	--	--
	1945	D-3	20.0	7.9	8.6	366	U	--	--
6-3-80	0800	D-4	17.0	9.1	8.6	317	U	--	--
	1030	D-5	18.0	8.9	8.9	313	U	--	--
	1317	D-6	19.5	8.9	8.8	308	--	20	80
	1540	D-7	20.0	8.8	9.0	325	U	--	--
	1946	D-8	19.0	9.0	9.0	301	--	--	--
6-4-80	0748	D-9	16.5	8.5	8.8	330	U	--	--
	1050	D-10	18.5	8.2	8.8	315	--	20	64
	1350	D-11	20.5	8.1	8.8	313	U	--	--
	1540	D-12	20.0	7.8	9.2	331	--	--	--
	2220	D-13	19.0	8.3	9.2	309	U	--	--
6-5-80	0750	D-14	17.0	8.4	8.0	318	U	--	--
	1045	D-15	18.5	8.0	8.9	308	--	--	--
	1304	D-16	19.5	8.3	8.5	308	U	24	76
	2302	D-17	17.5	8.6	8.6	323	U	--	--
6-6-80	0810	D-18	18.0	8.5	8.1	310	U	28	72
	1040	D-19	19.0	8.1	8.4	321	--	--	--

Table 9 On-site physical and chemical analyses of diluent grab samples (chlorinated).

Date	Time	Lab. No.	Temp. (°C)	pH (S.U.)	Conductivity (umhos)	D.O. (mg/l)	Total Chlorine (mg/l)
6-2-80	1338	DC-1	--	--	--	--	0.1*
	1600	DC-2	19.0	9.7	302	7.6	0.2
6-3-80	0800	DC-3	17.0	--	--	--	0.2
	1040	DC-4	18.0	9.6	297	8.0	0.3
6-4-80	0748	DC-5	16.5	9.5	332	7.7	0.1*
6-5-80	0810	DC-6	17.0	9.5	301	8.0	0.1*
6-6-80	0810	DC-7	18.0	9.4	315	8.3	0.1*

* Estimated

Table 10 On-site analyses of test container grab samples.

Date	Time	Side A or B	% Effluent	Temp. (°C)	pH (S.U.)	Conductivity (umhos)	D.O. (mg/l)	Total Chlorine (mg/l)
6-2-80	1532	A	100	18.5	8.0	3070	9.0	--
	1528		88	18.5	8.0	2750	9.0	--
	1525		75	18.5	8.1	2390	8.8	--
	1522		66	18.5	8.1	2150	8.8	--
	1520		50	18.5	8.2	1725	8.6	--
	1517		33	18.5	8.4	1250	8.6	--
	1514		25	18.5	8.4	1030	8.4	--
	1510		12	18.5	8.6	684	8.4	--
	1507		0	19.0	8.8	316	8.3	U
6-4-80	0845	B	100	17.5	8.0	2090	8.5	--
	0843		88	17.0	8.0	2770	8.5	--
	0840		75	17.5	8.0	2410	8.5	--
	0837		66	17.5	8.1	2160	8.5	--
	0834		50	17.0	8.2	1750	8.6	--
	0832		33	17.0	8.2	1250	8.6	--
	0830		25	17.0	8.2	1032	8.3	--
	0827		12	17.0	8.4	674	8.3	--
	0823		0	16.5	8.7	311	8.4	U

Table 11 Comparison of survey results with the Total Petroleum, Inc. NPDES Permit and Monthly Operating Report.

Parameter (Unit)	NPDES Permit Final Limitations		June Monthly Operating Report					
	Daily Average	Daily Maximum	Monthly Average	Monthly Maximum	6-2-80	6-3-80	6-4-80	6-5-80
290024 (001)								
Flow (M^3/day)	--	--	1,670	2,040	1,830	2,040	1,710	1,530
Total susp. sol. (kg/day)	79	134	36	61.2	--	61.2	35	31
Oil & Grease (mg/l)	--	10	3	5	3	2	2	4
Phenol (kg/day)	0.8	1.6	0.035	0.063	--	0.039	0.034	0.031
Sulfides (kg/day)	0.6	1.5	0	0	--	--	0	0
COD (kg/day)	847	1630	324	522.5	--	441	258	269
Temperature (°C)	--	--	21	26	--	--	21	--
Ammonia nitrogen-N (kg/day)	66	145	3.2	7.3	--	7.3	5.9	2.7
BOD_5 (kg/day)	72	163	20	27	--	24	24	13
TOD* (kg/day)	284	--	41.7	69.9	--	--	62.1	--
(kg/day/CMS)	--	202	--	--	--	--	13.5	--
pH (S.U.)	not <6.5 nor >9.5		min. 6.3	8.3	7.7	7.4	8.1	7.8

	Survey Results	
	6/2-6/3/80	6/4-6/5/80
Flow (M^3/day)	1,890	1,500
Total susp. sol. (kg/day)	21	26
Oil & Grease (mg/l)	(3, 4)	5
Phenol (kg/day)	0.025	0.034
Sulfides (kg/day)	0.64	--
COD (kg/day)	250	200
Temperature (°C)	See Table 7	See Table 7
Ammonia nitrogen-N (kg/day)	3.8	2.5
BOD_5 (kg/day)	19	15
TOD* (kg/day)	45	33
(kg/day/CMS)	--	7.2**
pH (S.U.)	See Table 7	See Table 7

1 - Survey results are for the composite sample. Grab sample ranges are shown in parentheses ( ).
* - 1.46 BOD_5 + 4.57 NH_3N ** - River flow = 4.6 M^3/sec.
To obtain MGD multiply M^3/day by 0.0002642 To obtain lbs/day multiply kg/day by 2.205

Table 12 Sample Preservation

Parameter	Preservative
COD & TOC	10 drops conc. H_2SO_4/250 ml (to pH <2).
Cyanide & Phenolics	Dechlorinate with ascorbic acid (if needed). 10 drops 10 N NaOH (to pH 12)/250 ml.
D.O.	Fixed on site.
Total Metals	2 ml 1:1 HNO_3/250 ml (to pH <2).
Dissolved Metals (Field Filtered)	2 ml 1:1 HNO_3/250 ml (to pH <2).
Microbiology	2 drops 10% sodium thiosulfate/125 ml to dechlorinate sample.
Oil & Grease	10 drops conc. H_2SO_4/250 ml (to pH <2).
Sulfides	10 drops 1M ZnAc/250 ml.

All samples cooled to 4°C and preserved upon collection and chain of custody maintained.

Survey by: Janice Bohn-Swanson, Aquatic Biologist
Lonnie Lee, Aquatic Biologist

Contact with Management: Patrick Lincoln, Director - Environmental Affairs
Bernie Shaver, Environmental Chemist

Physical, Chemical & Bacteriological Analyses by: Environmental Protection Bureau Laboratory

Report by: Janice Bohn-Swanson
Point Source Studies Section
Environmental Services Division
Environmental Protection Bureau
Michigan Dept. of Natural Resources

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